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THE IRON AGE

FEBRUARY 10, 1938

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FEBRUARY 10, 1938

ESTABLISHED 1855 Vol. 141, No. 6

A Big Job for Brains

A BUILDER of fine and efficient machine tools has given us something to think about. "My sales," said he, "have been due to the fact that the machines we make and sell are able to turn out more and better work, for the dollar of investment, than our competitors' or even than our own machines of a few years ago.

"Now, however," he continued, "we find a new factor entering the situation. In some plants and some sections of the country, there appears to be a growing resistance on the part of machine operators to let a new machine work to its full capacity and to exercise the advantages that have been built into it. Whether this is due to the 'unionization' movement or not, I cannot say, although it is not confined to union shops. At any rate the new machine is slowed down, not by management but by labor. If such conditions should become general, it would not pay any machine builder to strive for improvement."

Most of us will agree with the machine tool builder that it would be "just too bad" for all of us and for any hope of a higher standard of living if we put an end to efficiency gains, most of which have come from invention and improvement and which alone can create added purchasing power. American wages as well as American profits are machine made, not hand made in this machine age. But unless workers accept this fact as a fact, the path of improvement will be a thorny one.

What we must do is to learn more about the relationship of cost reduction to consuming power and after that work out a division of the gains among workers, consumers and proprietors best fitted to finance consumption. And that is a job for employers and workers to tackle together on common ground and for mutual benefit.

A hard job? Yes. But if you go through any modern plant and note the wonders that have been accomplished and the miracles that have been wrought through the application of brains and ingenuity, you can hardly doubt that the same quality of brains and pains can solve these economic puzzles if we apply them with equal determination and enthusiasm.

J. H. Van Deventer

More Light on an

THE need of replacing obsolete machinery is constantly being urged upon executives of manufacturing plants. However, lighting systems as well as machinery equipment become obsolete. Improvements in lighting have come so rapidly that a lighting system that was the best that could be had a few years ago may so lack in efficiency today that its replacement should not be delayed.

The factory lighting facilities of the Warner & Swasey Co., Cleveland, a few months ago probably were at least fully up to the average for a metal working plant, as changes had been made from time to time as more efficient lamps and reflectors were brought out. However, this company a few months ago decided to completely modernize its entire factory lighting system, believing that as lighting is improved a higher standard of quantity and quality may be established for its product; in other words, that with better lighting workmen will do better work and increase their output.

A great deal of study was given to the lighting problems of this plant and tests were made of various reflectors before new lighting plans were adopted. A summer vacation shutdown provided an opportune time for substituting a new lighting system and the work was done during that period so that there was no interference with production.

Entire System Changed

A uniform lighting system was adopted for the machine shops, tool room and pattern shop. Over 1000 new lights were installed in these departments and this number will be increased to over 1200 when all the changes in lights are completed. Old reflectors in the assembly department were also replaced by a new type of reflector. These are over 200 in number.

The lighting unit adopted for the machine shops and stock room is a Holophane reflector for extensive light distribution, having a deep prismatic glass bowl in which a 200-watt inner frosted lamp is used. The lights are placed in three rows on 10-ft. centers in each direction in each bay, the bays being 25 ft. wide. The lights provide 14 to 20-ft. candle illumination. The lights are 10 ft. above the floor, being close to the ceiling to clear the way of the runways of hand operated cranes that serve some of the floors. There are four outlets to each circuit instead of 12 as heretofore, so that only four lights need to be turned on if the illumination of only a small section of the floor is required. In these reflectors 500-watt lamps may be used, increasing the illumination 2½ times.

Tests made in the plant indicate an increased efficiency of the glass reflectors as compared with porcelain enameled metal reflectors. The company has also found that the efficiency of the glass reflectors is not impaired by cleaning. Light is well and evenly diffused throughout the shops so that there are no dark areas. Nearly all machine tools are now individually motor driven so that there is little overhead shafting and belting to interfere with the diffusion of light.

A portion of the light passes through the glass reflector to the ceiling from which it is reflected back through the room, thus aiding in the uniform diffusion of the light and building up intensity at low points. To obtain full effect of the lighting sys-

n Important Subject

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By FRED L. PRENTISS

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THIS photo shows the efficient lighting system that has been installed in the Warner & Swasey Co. plant. Photo was taken in the turret lathe department.

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tem the ceiling and walls were painted white. These surfaces were first thoroughly cleaned and then given one coat of paint, providing as white a surface as would have been obtained had two coats of paint been applied without cleaning the walls. In replacing the lighting system one floor was done at a time and the conduit that was taken out from one floor was reused on the next floor so that little new conduit was required.

For the assembly departments and where some of the larger machines are located on the first floor, intensifier type of reflectors of pure glass with a double wall and a silvery lining between the walls is used. The reflecting lining is sealed between the inner and outer walls. With these reflectors 500-watt lamps are used and the light intensity is said to be 2½ times that formerly obtained with metal reflectors and 750-watt lamps. There are 200 of these lamps located on 20-ft. centers in the assembling bays. The saving in current with the use of these lamps for a 10-weeks' period was sufficient to pay for the cost of the improved reflectors.

Daylight lamps with silvered clear glass mirror type reflectors, commonly known as show window angle reflectors, have been placed in the inspection department, replacing the ordinary inside frosted lamps and metal reflectors. The daylight lamps with clear glass reflectors are found more satisfactory because they reduce the glare without reducing the intensity to an objectionable degree. These lights, giving an intensity of 40 to 58 candles, are placed on 3-ft. centers in a straight continuous row for a distance of about 100 ft., directly under the crane rail along one side of the inspection line.

Current for localized lighting for most of the individually motor driven machine tools is taken from the power circuit through a 50-watt transformer attached to the machine. With a single line supplying current for both power and light, less wiring is required and it is easier to move a machine.

Special Lighting for Stock Bins

Improving the lighting of the stock room presented a problem because of the difficulty of lighting the interior of stock bins extending from the floor to the ceiling alongside narrow aisles. Several lights in stock bin reflectors are located at the ceiling, these adequately illuminating the aisles and upper bins. These ceiling lights are supplemented by the unique provision of a trolley duct that is mounted directly under the ceiling that has a runway the length of the building, the trolley duct taking the place of a stationary light socket. Connected to the trolley is a light cord attached to the other end of which is an ordinary light bulb with guard. This bulb is used for throwing light into the lower tiers of bins. With this easily movable lamp a stock room attendant may quickly throw the light into the back of a bin.

Good illumination is provided in the pattern shop with lamps with Holophane reflectors placed on 7½-ft. centers, the same as the work benches, giving each workman an individual light. These lights are 8 ft. 2 in. above the floor or 5 ft. above the work benches.

All light and power distribution systems start from the center or third floor, these systems extending upward

for the three upper floors and downward to serve the two lower floors and basement so that power is transmitted a minimum distance. Power feed lines to distribution panels are the same size their entire length. In usual practice these feeders start at the basement and the size of the wire tapers down before reaching the top floor. Feeders of uniform size have the advantage of flexibility, which is said to more than compensate for the increased cost caused by not having any reduction in the size of the copper feed wires.

Flexibility Provided

Another advantage is claimed for carrying the feeder system to the third floor for distribution to the other floors. With this arrangement of the power lines, should the power requirements increase, the feeder system may be divided by the provision of additional feeders. Then the former feeders will provide current only for distribution through the three upper floors and new feeders will serve the three lower floors. Every conduit has a separate panel at the main switchboard.

ABOVE

VIEW in the inspection department, showing the intensive illumination provided in that department by the row of closely spaced daylight lamps with show window angle reflectors under the crane rail.

o o o

AT RIGHT

ANOTHER picture showing the improved lighting facilities, this being taken in the unit assembly department.

An Analysis of the Grinding Process

By ROLAND V. HUTCHINSON

Olds Motor Works, Lansing, Mich.

THE accompanying article is abstracted from an unusual paper presented at the national production meeting of the Society of Automotive Engineers, held at Flint, Mich., Dec. 8 to 10, 1937. In it the author recites a few general premises and considers qualitatively what by observation and a little measurement, he has come to believe approximately happens when a grinding wheel is at work. The original paper is replete with mathematical analyses to sustain his contentions, but only the general analyses and conclusions are presented in this brief review of a new approach to the familiar problem of grinding metals.

NEGLECTING surface grinding with a cup wheel face, and confining our attention to the use of the periphery of cylindrical wheels, we may cut "up," or "climb-cut," to borrow terms from milling practice. The ordinary surface grinder, with work reciprocating past the wheel, indulges alternately in both forms.

In cutting up, a curved wedge shaped chip is removed, *ideally* starting at the thin end of the wedge and increasing in thickness almost to the breaking-out place, then rapidly diminishing in thickness. In climb-cutting, a different wedge shaped chip is removed, starting at its big end and building up rapidly to maximum thickness and then proceeding toward the small end.

Consider for the up-cut case the sequence in which things happen in building up a chip: *Ideally* the cutting particle immediately enters the work at the thin end of the wedge, increases depth of cut per abrasive grain until almost through, and rapidly diminishes this depth as it breaks out. A radial force is required to make the grain penetrate the stock initially. Once this has occurred the material piles up ahead of the grain, the parent metal failing by compression and shear. The duller the edges, the greater the required force for penetration. This radial force is produced by the elastic reaction of the grain, its bond support, the surface of the work, the workpiece as a whole and the grinding machine itself. So, if the work be not immediately penetrated by an abrasive particle, such particle slides along the surface of the work, until a sufficiently large force has been built up to start cutting.

Further, what happens *first* to the wheel, happens last to the work. Hence in using a wheel with somewhat dulled abrasive, the work is scrubbed frictionally by such grains and this scrubbing occurs as the work swings *away* from the wheel (see reference to coolants). As the grain edges dull still more, the forces exerted on them by the work become great enough and so directed as to either shear the grain or tear it loose from its bond. In other words, the wheel "breaks down."

Simple mathematical analysis shows that the normal pressure between work and wheel varies as the square of the grain dullness, or doubling the dullness, quadruples the normal pressure. The length of skidding along the thin end of the wedge is likewise proportional to the normal pressure, and the temperature rises of both work and wheel are also proportional to the square of the dullness, neglecting the effect of coolant.

Effect of Wheel Structure

In the climb cut case, the grains start to cut at the big end of the wedge, and a relatively large geometrical interference is rapidly established, and arguing from other metal cutting experience, once a chip is started it is not especially difficult to maintain it.

Next consider the effect of grain spacing or wheel structure. The chip material is composed of small pieces

which have parted from the parent metal by a combination of shear and compression failure. The material of the chip, being harshly worked, becomes quite hot, and its net volume increases. The volume entirely enveloping the chip is much greater than that of the chip itself, and as the chip grows due to the abrasive edges continually advancing through the metal, so must the overall volume of the chip *ideally* remain smaller than the inter-granular volume at wheel perimeter. As the overall volume of chip increases above this value, the chip itself is forged between wheel and parent material and still further heated, even to its melting point. With relatively large chips and a somewhat dovetailed inter-granular space, it is easily possible to forge the chip into this space. When the bond is sufficiently strong, this forged-in chip stays in the wheel—the "loaded" condition.

As the forging work done on the metal removed increases, the heating of the chip and the consequent additional friction work done by scrubbing the hot chip over the parent material yet to be removed combine still further to heat the wheel, the chip and the parent material. A slight heating effect occurs in the parent material itself due to metal severance, but this is of itself very minute.

Tests show that heating of the work surface is partially proportional to length of chip path for a given sharpness of grain. Tendency to wheel breakdown increases with the depth of cut. Heating of the wheel depends jointly upon the rate of dulling of the wheel and upon the extent of filling of the intergrain cutting clearance spaces in the active wheel face. Heating of the work surface may thereby be lessened by the use of a stronger abrasive, a weaker bond, wider spacing of existing abrasive grains (by proportioning the amount of bond to abrasive grain), and increasing wheel speed, combined with the foregoing. Heat developed at the work surface may also be somewhat reduced by climb-cut grinding, since friction due to scrubbing as the work passes the size point is potentially reducible.

Heating in Shoulder Surface Grinding

Shoulder surface grinding is frequently done. With carburizing parts it may, however, be a risky procedure. The situation is really as follows: The periphery of the grinding wheel is one whose properties are selected primarily to grind the cylindrical portion of the shaft. When the wheel is moved side-wise to finish the adjacent shoulder with the side of the wheel, the length of chip path increases enormously. The inter-granular volume is not increased; hence with any but the lightest cuts, a chip may very easily overfill the chip space and tremendous heating result. When internal stress conditions are just right, chunks of work, may and do, jump right off.

An excess in depth of cut of 0.0002 in. may, in critical cases, make all the difference between trouble and no trouble. Dressing the side of the wheel slightly concave does not change the cut-per-grain situation much, but it does permit the wheel corner to break down faster and so promote effective openness of structure. The wheel structure should obviously be as open as possible consistent with the satisfactory and economic production of the adjacent cylindrical surface. The machines themselves should be kept in smooth running order so that the cut may be felt by the operator.

Wheel Keenness and Scratchy Work Surface

During wheel truing, certain abrasive particles may have been sheared through, others torn bodily from their holding bond and removed, and still others displaced perhaps from their original position and jammed into the wheel. As grinding proceeds they often loosen and roll between wheel and work, leaving scratches whose lengths approximate those of the interference paths. Such scratches may be reduced in frequency by giving the rotating wheel a slight rub with an oil stone just after diamond truing.

A further cause of scratching will now be touched upon. With a sharp cornered truing diamond a fairly sharp thread is chased on the wheel, and as the table reversal takes place an opposite hand thread is produced, making a series of protrusions on the wheel surface. As the protruding particles dull, their securing bond is not so strong and they readily break away and are carried on sometimes between the work. As the wheel loses these protuberances, it is still in fairly good shape and produces less scratchy surfaces. The smoothness of surface finish produced by a newly dressed wheel and the same wheel ready for redressing varies between wide limits under these circumstances.

The sharper form diamond will leave more ridges and pimples on the wheel, so for finishing, a rounder form is usually preferred, of curvature such that it will envelope say three times the wheel feed.

For *constant wheel r.p.m.*, both the likelihood of stuck particles existing and the self cleaning tendency of the wheel (due to centrifugal force) are proportional only to the wheel diameter for a given shape diamond, depth of cut, and dressing time. However, for *constant surface speed* and time of dressing cycle, as the wheel diameter is reduced, the likelihood of stuck particles existing is reduced, and the centrifugal self cleaning tendency of the wheel varies inversely as the wheel radius. As the wheel is reduced in size and its surface speed maintained, the lengths of such scratches as may occur are reduced with the consequent reduction of the grain interference path. Hence for freedom from scratches, small diameters of wheels are indicated.

Coolant Problems

However, wheel cost per article made is often lessened as wheel size increases, and wheel sizes are set therefore by commercial compromise.

With up-cutting, the provision of a large supply of coolant when grinding materials which have been subjected to drastic heat treatments may be hazardous in the following respect. With the grinding wheel in an intermediate stage of dullness, as the work swings up away from the wheel the hot scrubbed surface immediately is subjected to a violent quench, often resulting in the formation of grinding cracks. Coolants with ability to readily wet the work surface, and those of relatively high heat conductivity will surface quench the work faster than others, encouraging cracking. The *material* characteristics encouraging crack production are low strength coupled with high hardness, and high coefficient of expansion coupled with low thermal conductivity.

In grinding materials prone to heat checking, it is of first importance to keep the work surface cool and free from violent temperature changes. Rather than attempt this with copious use of coolant, in some instances it may be better to separately cool the wheel by air blast or spray, at the same time using a very hard and strong abrasive grain in a fairly weak bond, with structure open enough to easily accommodate the chip volume per grain. To attain good wheel life it may be necessary to run at high surface speeds.

The writer believes a mixture of 5 lb. of ordinary automobile soap

(CONTINUED ON PAGE 47)

Grinders Predominate in Machine Tool Developments

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By FRANK J. OLIVER
Associate Editor, The Iron Age

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IN reviewing developments in machine tools during 1937 (THE IRON AGE, Jan. 6, p. 186), it was found that new types of grinding machines exceeded in number by a wide margin any other related group of machine tools, largely representing the demand for greater accuracy and the wider use of hardened and ground parts in machine design. So too, we find in reviewing the announcements of machine tool manufacturers received during the last month that grinding machines again predominate. In other types of equipment, however, originality in design is very marked. Oddly enough, a machine that stands out from the point of view of originality of approach is a totally unconventional shaving machine that is doing the work formerly accomplished by eight cylindrical grinders.

This unusual unit, made by the *National Broach & Machine Co.* of Detroit, is in the form of a vertical station-type machine with four panels disposed on a rotating rectangular column. Each panel is tooled alike and carries three motor driven spindles, one for revolving the work and two for the shaving cutters. One cutter shaves a cylindrical hub bearing and the second shaves a flat bearing face or shoulder. Cutters are circular and beveled, with a tooth form similar to that of a broach. Both cutters and work are revolved at high speed and the chips produced are fine and hair-like. Working simultaneously, the cutters remove about 0.010 to 0.015 in. from the shoulder and from 0.020 to 0.030 in. from the cylindrical surface within a limit of 0.001 in. on dimensions and alinement.

Cycle time is 28 sec., the time of one revolution of the column, but one part in completed every 7 sec. The work is mounted on centers and cutting begins as soon as the operator locks a handle.

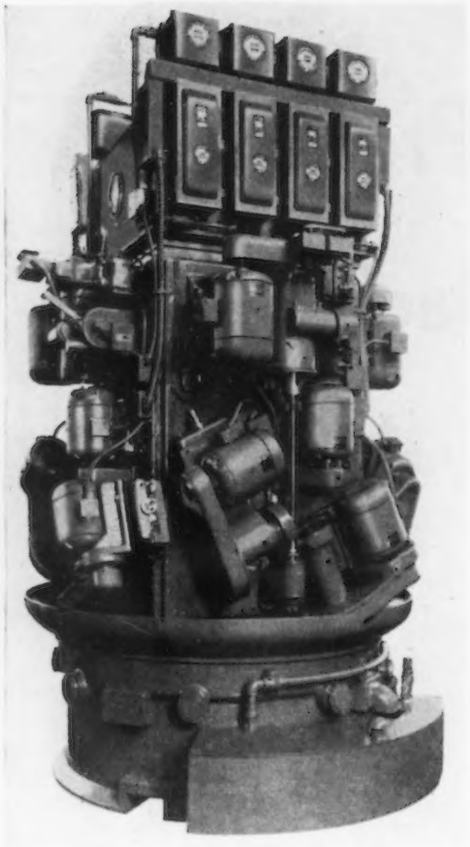
There are 18 motors used to drive the various elements, and the control equipment is mounted on top in a covered compartment with safety interlock. Plugging relays prevent coasting when the automatic control mechanism turns off the current. Each column panel carries its own forced feed lubricating system, and coolant flows only while the cutting is in progress. All slides are hardened and ground. V-belt drives and anti-friction bearings are used throughout. The machine stands 16 ft. high.

NOT in a long time have we been able to present so many novel design features in machine tools as are described in this review. Aside from the several new grinder designs, we find a rotary shaver doing the work of a grinder, a way-type boring machine with a new idea in hydraulic feed, a hydraulic feed cutting-off machine, and a number of cleverly designed machine tool attachments—not to forget a "first" in woodworking shaper design. Next week's review will cover equipment for use in the welding shop.

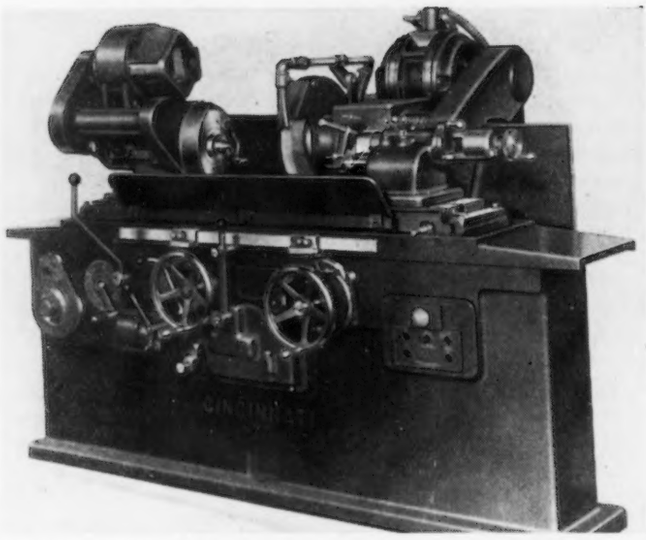
New Grinder Designs

A number of interesting features designed to produce the best grade of finish with a high degree of accuracy are to be found in the new *Cincinnati* universal grinding machine, built in 12 and 16-in. sizes, and 24, 36, 48 and 72 in. between centers. The wheelhead unit provides accurate adjustment of the wheel to the work through square gibbed slides and narrow guides well protected. Alinement between headstock and footstock units is obtained by means of a truncated locating V in the top of the table.

The wheel spindle design and its lubricating system are similar to those in the Cincinnati roll and plain cylindrical grinders. The bearings are the multiple-shoe type and are self-compensating for change in load. The bearing chamber is completely filled with oil under pressure created by a



NOT a grinder. Instead, cylindrical bearing surfaces and shoulders are shaved to size within a tolerance of 0.001 in. on this unconventional National Broach unit, which replaced eight cylindrical grinders.



MECHANICAL and electrical controls are conveniently located on this new Cincinnati universal grinder, which incorporates an oil pressure switch to protect the wheel spindle bearings.

AT RIGHT

A FIXED spindle mounted on preloaded ball bearings, with elevating knee, are features of the Covel No. 15 handfeed surface grinder.

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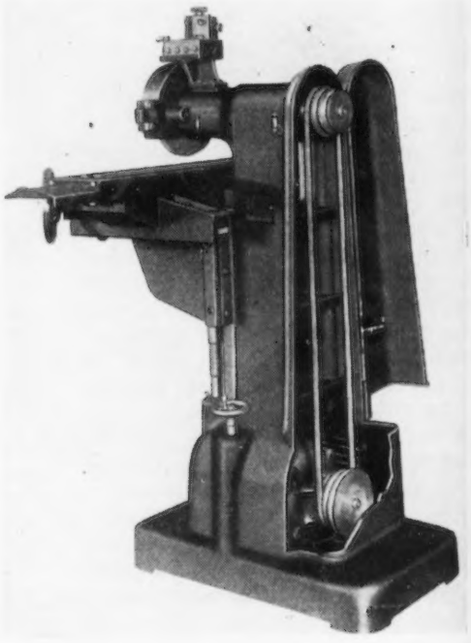
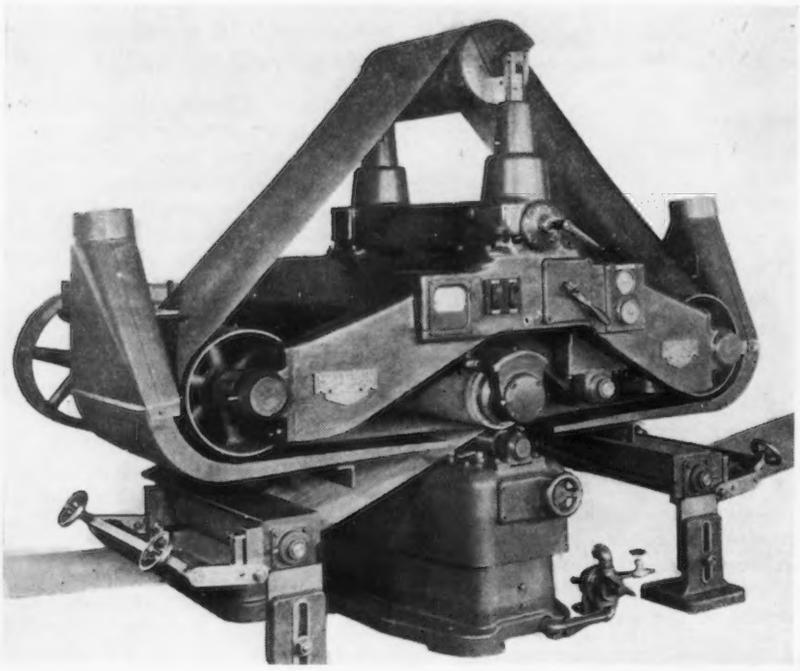
BELOW

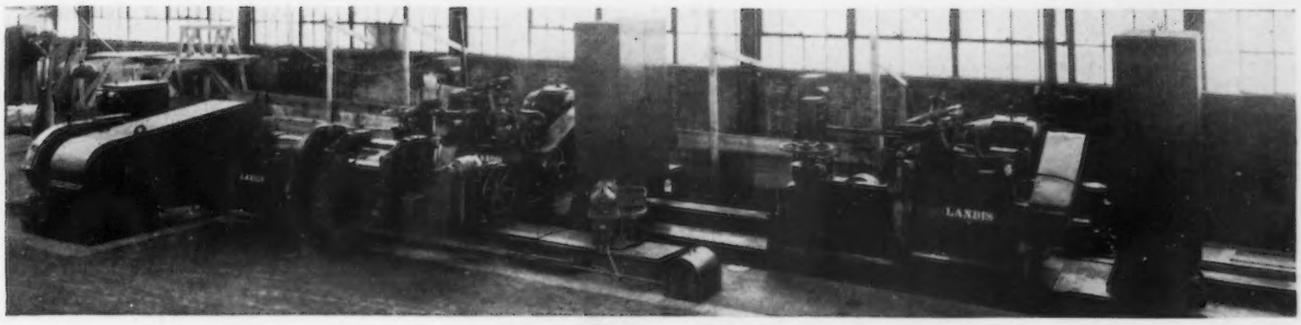
STRIP coil stock can be run through this Mattison grinder in either direction. A coated abrasive belt is the grinding medium, driven by power reels at both ends.





small motor driven pump which draws its oil from a reservoir and feeds it through a renewable filter. As soon as the pressure builds up to about 4 lb., a pressure switch starts the main drive motor. Failure of pressure immediately stops the motor. When the filter becomes clogged with dirt, the oil bypasses to the reservoir, relieving the pressure and stopping the main motor.

Wheel spindle drive is by motor through multiple V-belts. The standard fixed internal attachment is also driven by the same motor. A swing frame internal grinding attachment is optional. Power for the headstock is

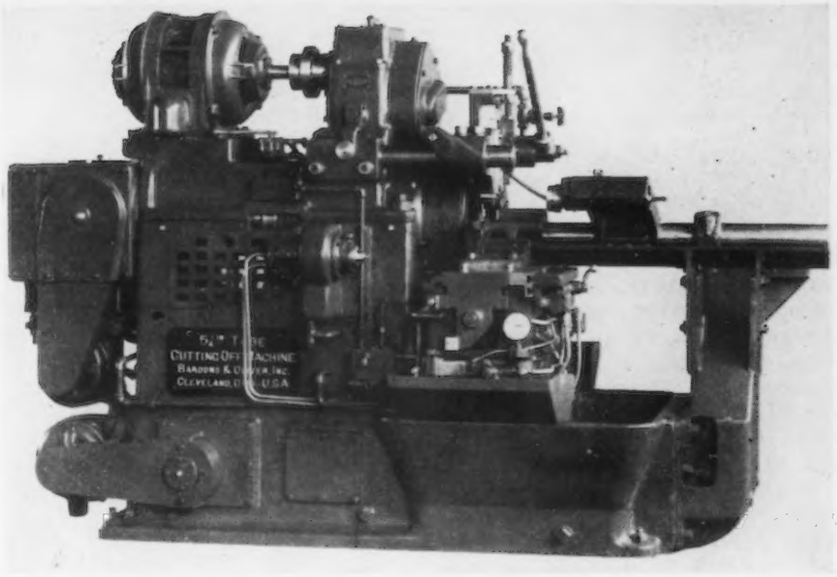


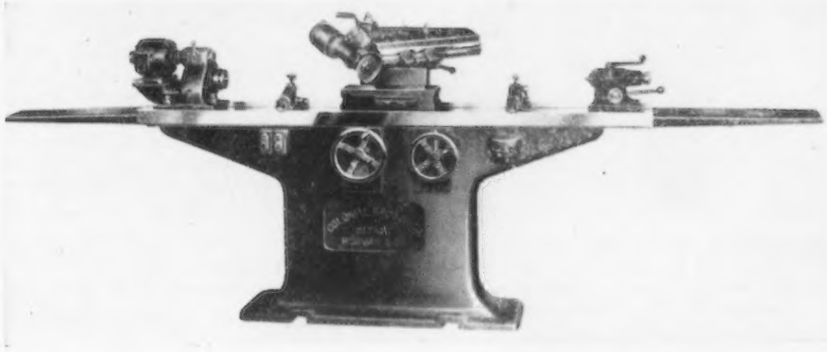
ABOVE

INDEPENDENT semi-finishing and finishing wheelheads are used on this type 30 Landis roll grinder.

transmitted from its motor to the faceplate by V-belts and silent chain. A ¾-hp. variable-speed motor is used, controlled by a rheostat giving speeds ranging from 60 to 240 r.p.m. Table movement is by rack and pinion, with 12 traverse rates available from 4 to 63 in. per min. The footstock is provided with a combination screw and quick acting hand lever for the center movement.

As to the universal features, the headstock swivels through 150 deg.; the wheelhead, 90 deg. either side of center, and the table, 10 deg. forward and 2 deg. back.





ABOVE

TWO hydraulically actuated slides split the cut on this Bardons & Oliver cutting-off machine, with automatic stock feed.

o o o

AT LEFT

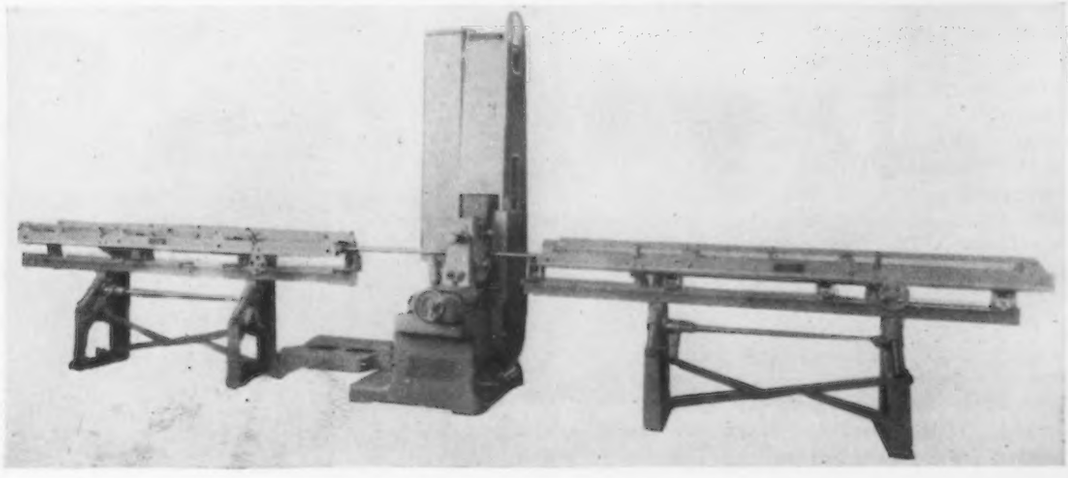
NOVEL design features, extreme flexibility and simplicity in operation are to be found in the Colonial "Universal" broach sharpener, for flat or round broaches.

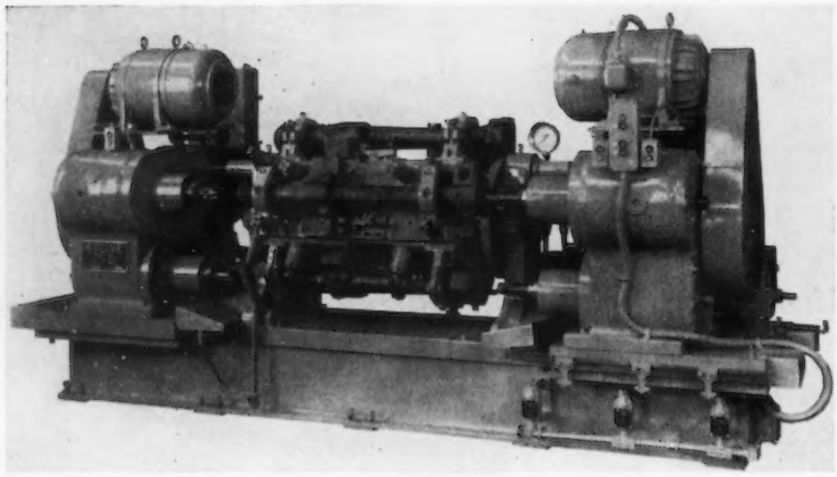
o o o

AT RIGHT

WORK up to 14 ft. long and 6 in. in diameter can be polished with the aid of a new fixture for "Production" machines.

o o o





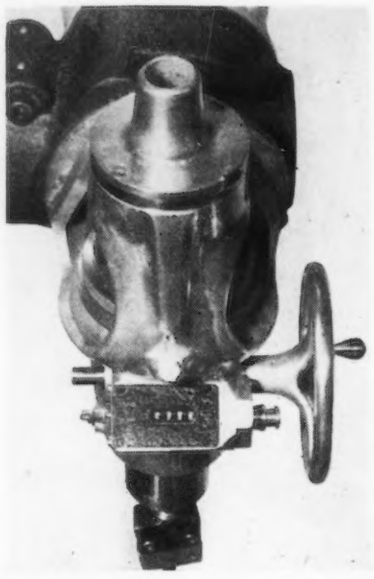
THE hydraulic cylinder for traversing the two heads is within the drum-type indexing fixture in this special Moline boring and drilling machine.

Electrical control buttons are built into compact units. The group at the right includes start and stop buttons for the grinding wheel (also starts the table feed box), a button for the coolant pump, start and stop buttons for the internal attachment (also starts the table feed box), and a large red button which stops everything. The group at the left includes a three-position button for the headstock motor and coolant pump, and the rheostat. The table traverse engaging lever and the handwheel are directional controls. Work diameter reduction may be adjusted to an increment as low as 0.00025 in. through the automatic pick feed mechanism. A cross feed back lash arrangement is self-adjusting.

Covel Mfg. Co., of Benton Harbor, Mich., is offering a handfeed surface grinder of 6 x 18-in. capacity for toolroom work where accuracy and quick changeover from job to job are essential. Main features are a fixed spindle mounted on precision, preloaded ball bearings, with the table carried on a box-section knee mounted on the column.

The spindle is rigid enough to grind cemented carbide tools. Elevation of the knee, longitudinal table traverse (19½ in.) and cross feed are all by handwheels. The wheel for vertical elevation is graduated in thousandths, and the table traverse wheel has a ball bearing quill and drives through a helical pinion and rack.

The spindle is driven by V-belt from a motor totally enclosed in the base, and cone pulleys give three speeds of 1900, 2350 and 2900 r.p.m. A door, hinged for the full length of the column, permits easy belt shifting. The 1½-hp. driving motor is mounted on a hinged plate with vibration dampers and a handwheel and screw provide for the adjustment of belt tension.



ACCURATE depth adjustment is obtained by a built-in Veeder-Root counter on this Dalrae "Midgetmill" angular milling attachment.

Among the attachments available are a wheel truing device with diamond, a portable coolant tank for wet grinding and a motor driven dust collector device for dry grinding.

An unusual design of head construction is employed in the new "Universal" broach sharpener, announced by *Colonial Broach Co.*, Detroit. It is provided with a grinding head adjustable through an arc of 180 deg. horizontally and vertically from a horizontal position to 90 deg. below horizontal. The head is fitted with a hardened slide traveling on two roller chains riding on hardened and ground ways. The entire slide mechanism is sealed against dust. The head is also adjustable for side play. Hydraulic feed for automatic operation may be incorporated. The grinding wheel spindle is direct motor driven with a standard speed of 3600 r.p.m., the motor being of ¾ hp. The spindle is carried in adjustable preloaded, double-row bearings. Frequency changers permit spindle speeds up to 10,800 r.p.m. Maximum travel of the slide is 10 in. Adjustable stops are supplied on the head fitted with thumb screws. The permanent stops on the grinding head support are spring loaded to cushion the head and wheel against shock.

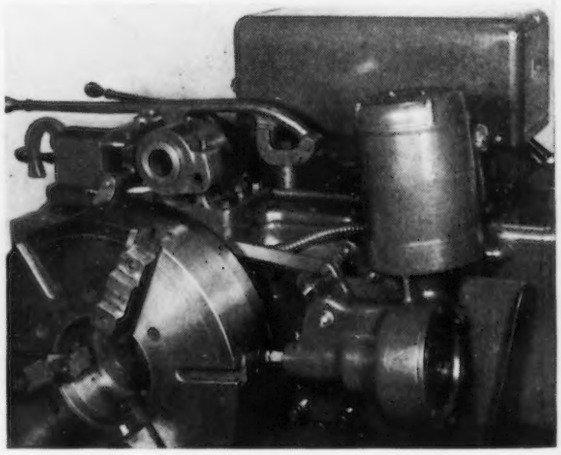
Adjustment of the grinding head column vertically is 10 in. and is by means of a handwheel. Hardened and ground ways are provided for the column also.

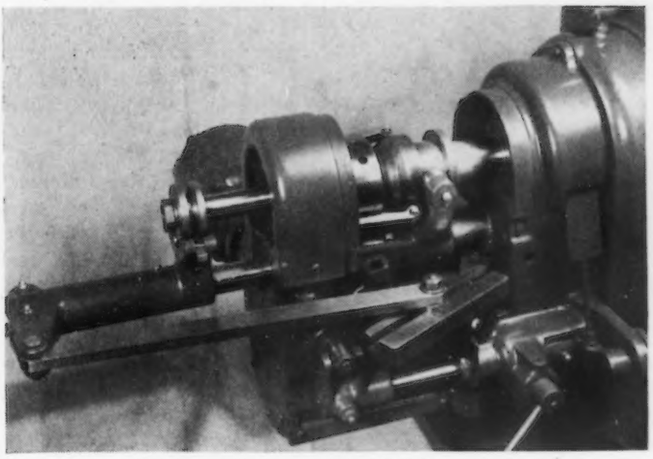
The broach sharpener table has a maximum travel of 60 in. Adjustment of the table is through a worm and wheel, with graduated handwheel. For work requiring extraordinary accuracy, a vernier worm and wheel

o o o

A WIDE variation of gripping pressure is provided by the power chuck wrench for application to ordinary hand-operated scroll chucks on Warner & Swasey turret lathes.

o o o





THE new W. & S. power driven bar chuck and feed unit is shown with guards removed.

mechanism can be supplied to operate the main handwheel, permitting adjustments to 0.0002 in. Table ends are provided with dust guards.

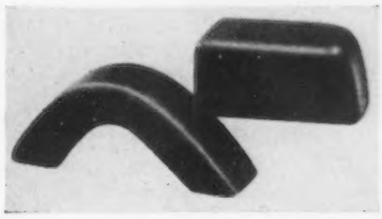
For grinding round and spline broaches, etc., there are provided a headstock, a tailstock and barrel-type steady rests. The headstock is of the two-speed motor-driven type and has a center swing for 10 in. diameter work. The tailstock is of the quick adjustable type and is provided with a 1½-in. off-center adjustment for tapering of broaches. With a few minor adjustments the machine will take flat broaches up to 10 in. in width if the broaches have straight teeth and slightly narrower for angled teeth.

Some time ago the *Landis Tool Co.* built a dual wheel carriage type 30 roll grinder to grind rolls of exceeding hardness from the rough without the usual turning operations; then the roll was finish ground on the same machine by the use of the second wheel carriage. Another of these machines has since been installed to semi-finish and finish grind conventional types of rolls, and it has some interesting differences.

The size of the machine is 36 x 168 in. The rear bed section has extra length so that two standard wheel carriages may be mounted on it. Either carriage will grind a roll the full capacity of the machine without interfering with the second carriage.

Since the majority of the rolls are crowned during both the semi-finishing and finishing operations, the finishing wheel head should track with absolute accuracy so as to follow the form produced on the roll by the semi-finished head. Thorough tests reveal that the wheel heads do track within a close degree of accuracy.

This machine is equipped with the new work drive adopted for all standard type 30 roll grinders. It consists of motor, direct connected gear reducer and silent chain drive to the spindle. The entire base of the drive is independent of the bed, and motor vibrations cannot be transmitted to it. A multiple V-belt drive may be had at extra cost.



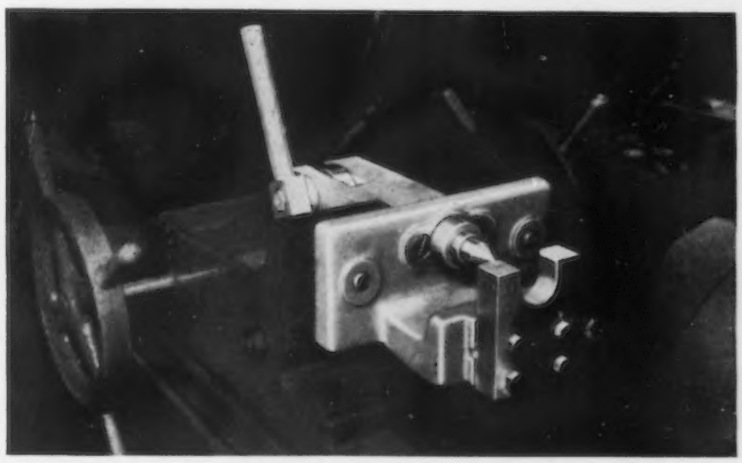
MONARCH lathes now have Duprene synthetic rubber wipers in place of felt.

The machine weighs approximately 185,000 lb., including all electrical equipment. Fifteen electric motors, having a total of 96½ hp., are used. They include two traverse drive motors, two water pump motors, two rapid electric wheel head cross movement motors, two wheel spindle oil pump motors, two wheel carriage oil pump motors, two wheel drive motors, work drive motor, footstock traverse motor, and center grinder motor.

All motors for complete operation may be controlled from the wheel carriage. The wheel carriage motors are interlocked in such a manner that when one is operating the other cannot be operated. A jog switch enables the operator to examine the roll from the front of the machine.

The *Mattison Machine Works,* Rockford, Ill., has designed a continuous grinder for the grinding of strip coil stock through the use of factory coated abrasive belts. After hot rolled coils are pickled, annealed and cold reduced, strips that show any imperfections may be ground by this machine.

Power driven reels are placed at each end of the machine from which the strip passes guiding rolls and over the work support roll. Work support roll is air actuated for disengaging the work from the belt. Ample movement is provided to allow extra room for passing the strip under the belt in loading. The grinding roll is cushioned and has adjustable grinding pressure. The abrasive belt is driven from both ends, so it can be run in either direction, according to direction the strip is traveling. The flexing of the strip as it passes over the support roll and the point contact of the grinding roll provide for fast-cutting belt action. Machines are



THIS special fixture assures concentricity of thread and work as cut on a Landmaco threading machine.

available for grinding 12, 18, 24, and 36 in. wide strip.

Novel Cutting-Off Machine

Hydraulic feed to front and rear cross slides is one of the many features of a new automatic cutting-off machine developed by *Bardons & Oliver, Inc.*, Cleveland, for cutting light and heavy wall tubing, pipe and bar stock up to 5¾ in. in diameter. Both slides operate simultaneously, dividing the chip equally and thereby reducing the cutting time. Where the pieces are not too long, two or more pieces can be cut off at a time by multiple tooling. A separate pump is used for feed and for rapid traverse in both directions. The feed pump is driven directly off the spindle and feeds are obtained in thousandths of an inch per spindle revolution. Feed increments in ten thousandths are obtained by a graduated dial on the feed pump. The rapid traverse pump is driven separately. When the machine is running automatically, movements of the slides are controlled by trip dogs on the front slide, but a valve is also provided for manual operation on short run jobs.

The forged spindle is mounted in roller bearings and a splined gear gives two speeds by level control. A much wider range of speeds is given by change gears. All gears are alloy steel, bath lubricated and mounted on roller bearings. The master collet is a hinge type, air operated, and is provided with sets of false jaws to suit different diameters. The stock stop is also air operated and is provided with fine adjustment along its mounting bar.

Another feature is a patented roller bar feed, driven by a separate motor and maintaining a constant feeding rate regardless of spindle speed. The feed may be reversed electrically for backing out the stock, and a disconnecting feature allows the feed rollers to be spread apart when the collet is open so as to accommodate a flared or ragged end. All movements of the stock stop, collet, roller bar feed and tool slides are synchronized by the single set of dogs on the front slide. For solid bars, it is possible to increase the spindle speed as the diameter of the bar is reduced by the substitution of a variable speed motor for the constant speed drive motor normally supplied.

Unusual Way-Type Boring Machine

Another machine incorporating some original design features is a way-type boring and drilling machine with five-station indexing fixture recently built by the *Moline Tool Co.*, Moline, Ill., for rough and semi-finish boring, reaming, counterboring and drilling both ends of tractor steering bolsters or pedestals for ball race seats. This method supplants five vertical boring and drilling units.

The outstanding feature of this machine is the design whereby the drum-type fixture revolves on large ball bearings mounted on a long double-ended hydraulic cylinder by means of which the two boring heads are pulled into place. Thus, the boring and drilling spindles are pulled into the work by piston rods connected directly to the center of the spindle carrying heads, thereby exerting a pull in line with the work and eliminating strains on the bed and wear of the ways, besides assuring perfect alinement and precision.

There are four work stations on this fixture, the fifth station at the top being for loading. Indexing stops are spaced between the work stations and a pedal is arranged so that the operator can easily revolve the drum and fixture to its next position. The fixture is accurately positioned during the boring and drilling operations by two plunger pins, one in each side of the fixture, that enter and withdraw with the movement of the boring heads. In this instance, the revolving drum is equipped with holding fixtures for three different sizes of pedestals.

The feed cycle of the boring heads is automatically controlled by hydraulic units, each head having a rapid traverse forward, feed, dwell against a positive stop, rapid return and a neutral position. A four-station push button gives the operator control of the various points in the feed cycle as well as the emergency reverse. The boring heads or carriages have extra large bearings on hardened steel ways, are provided with gibs and are equalized by steel racks and pinions. The three boring spindles on each head are fitted with standard milling spindle noses. All spindles are mounted in anti-friction bearings and are driven by wide faced gearing and V-belts with motors mounted on the boring heads. The multiple-spindle drill heads are complete units and other heads may be substituted. They have end adjustment to compensate for drill wear.

Polishes Long Work

The *Production Machine Co.*, Greenfield, Mass., has designed a work supporting and feeding fixture for polishing long work in its type A and No. 101 machines. The fixture is made in two units, each about 8 ft. long, and these are placed on both sides of the feed member of the polishing machine. Work up to 12 or 14 ft. long and from ½ to 6 in. diameter can be polished. Weights up to 150 lb. can be handled, provided the work is fairly straight.

Each fixture has 12 rolls arranged in three groups of four rolls each. The lower group are the supporting rolls. There are two groups of side rolls, one group placed each side of the supporting rolls and above them. The rear group of the side rolls are fixed at the work center height of the machine, which is the same regardless of work diameter. The front group of side rolls must be adjusted by handwheel each time the supporting roll group is moved to keep the roll centers at the height of the work center. The supporting roll group is adjusted

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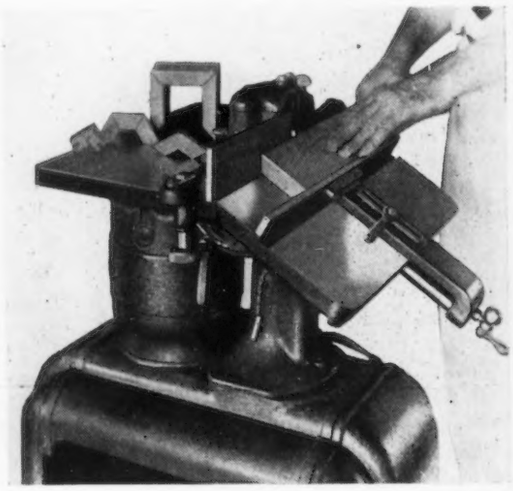
THIS new Yates-American woodworking shaper is the first to be equipped with a tilting table and comes in either a bench or floor type.

o o o



in a similar manner with the exception that a lever is used. Provision has also been made to adjust the idler rolls to the feeding angle of the feed unit on the polishing machine so that they will help feed the work also.

High Speed Milling Attachment

A unique use of a Veeder-Root counter is found in the new "Midgetmill" angular attachment for a horizontal miller, making it possible to mill, bore or drill at various angles. The device is made by *Dalrae Tools Co.*, Syracuse, N. Y. The counter is used to position or set up the cutter or end mill and provides an extremely accurate, direct reading instrument. Tests have shown that the maximum error obtained in a 2½-in. stroke is 0.00025 in. The spindle quill is fed by a triple lead screw engaging a bronze nut, which in turn is driven by a worm and worm wheel cut in the nut body.

The usual features obtained in the Dalrae "Speedmill" are found in the Midgetmill, such as the use of aluminum castings wherever permissible, heavy cast iron cradle and the balanced design whereby the weight is distributed equally on either side of the overarm.

Power Chuck Wrench

A power driven chuck wrench and a power operated bar chuck and feed mechanism have been announced by the *Warner & Swasey Co.*, Cleveland. Employed on chucks from 12 to 28 in. in diameter, the power chuck wrench is attached by means of standard adapters to new saddle type machines or to those of recent design now in service. A feature is the variation of gripping pressure made possible by the use of a transformer with eight voltage outlets. Maximum gripping pressure exceeds that of a hand wrench, while minimum pressure is slight enough not to cause distortion on delicate work. The unit is intended primarily for use with 3-jaw universal scroll chucks, but it lends itself also to the operation of 4-jaw independent chucks, or in fact, any chuck having radial wrench sockets.

In use, the operator lines up a mark on the periphery of the chuck with a pointer on the machine and then engages the square end of the power wrench by pulling the handle toward him. Turning the handle to left or right controls the direction of rotation of the wrench. A safety interlock prevents the machine clutch being engaged until the wrench is withdrawn.

The bar chuck and feed mechanism can be furnished with the W. & S. Nos. 1 and 2 electric and No. 2 geared-head turret lathes. It is driven by an independent fractional-horsepower motor, and the mechanical elements remain the same as for the manually operated devices. The single operating lever is located near the cross slide, and on the No. 1 machine, the device can be tripped by the cross slide movement. The attachment is also adaptable for second operation work where no feeding motion is required and where the collet must remain open at the end of the cycle for the insertion of the new work piece. For first operation work, the feed stroke can be adjusted up to 4 in. on the smaller machine and up to 6 in. on the larger.

Wipers made of Duprene, the new synthetic rubber, are being used in place of felt on all carriage wings as well as tailstock bases of lathes made by the *Monarch Machine Tool Co.* of Sidney, Ohio. These rubber wipers are not affected by oil or other liquids and never have to be cleaned, since they absorb no dirt. They are compressed tightly enough to prevent any foreign substance getting between the bearing surface of the carriage and the ways. They are said to last indefinitely.

Threading Fixtures

A fixture was recently designed by *Landis Machine Co.* for use in accurate production threading on the Landmaco threading machine in order to provide a rapid method of locating the work and assure concentricity between the thread and the work. A traveling center is located in the die head to support the front end of the work and to prevent the chasers leading off center. A heavy spring maintains a constant pressure on this center. A second center is located in the carriage directly back of a steel block shaped to fit the work contour. This center is mounted on a short spindle which is advanced by a hand operated cam.

The work is first located on the traveling center, then dropped into the block on the carriage. Locking of the shoulder of the piece against this driving block takes place when the cam handle is pushed forward. The cam gives a positive lock.

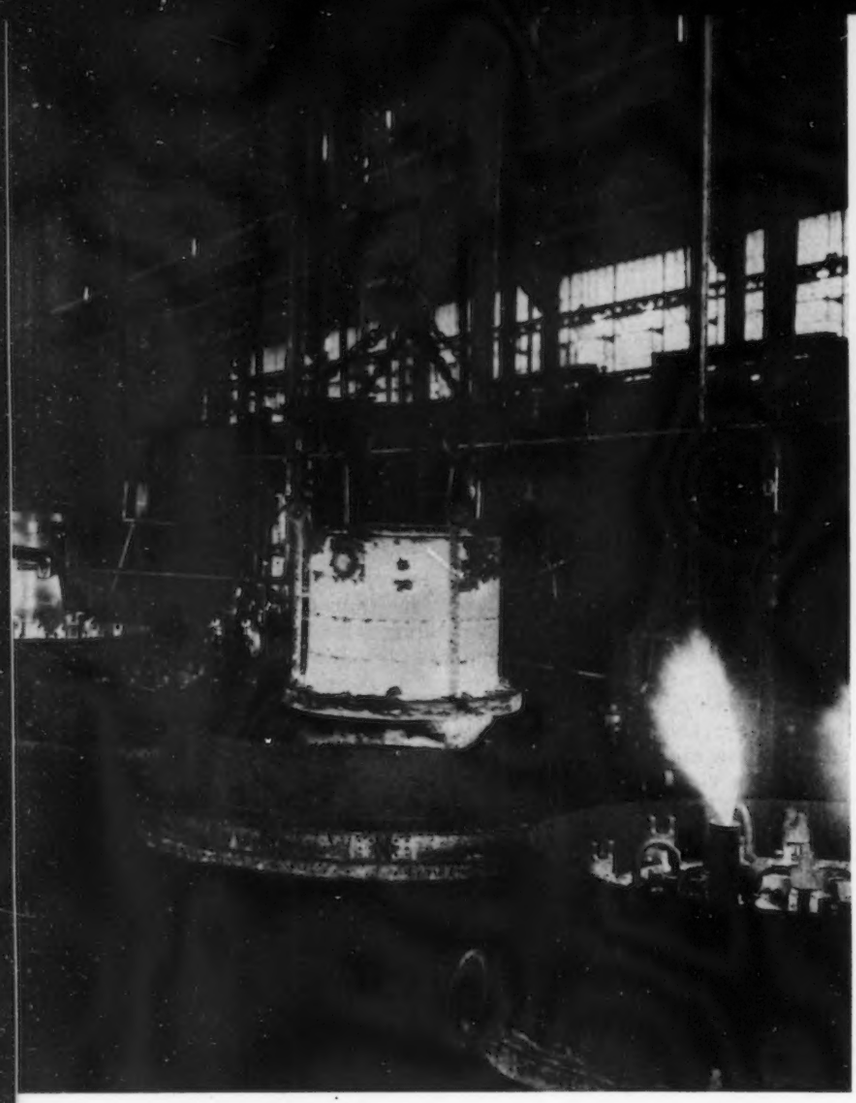
Woodworking Shaper

What is probably the first woodworking shaper ever to be equipped with a tilting table has recently been announced by the *Yates-American Machine Co.*, Beloit, Wis. The manufacturers stress its modern design, the ease with which it can be set up, the inexpensive knife equipment and its low power consumption. It is intended for light industry, schools and in the home shop, and is furnished in either a bench or floor type.

The new type of table (optional) makes it possible to cut bevels and intricate moulding with standard shaper knives. Two other exclusive features are a screw operated outside holdover fence and a spring-loaded chipbreaker for surfacing operations.

The completely enclosed drive employs a flat, fabric belt and speeds of 8000 or 10,000 r.p.m. are provided. A rigid foundation—essential at high speeds—is furnished by the extra heavy base. Motors of either 1/3 or ½ hp. are available.

A UNIQUE grandstand was recently built at Sapulpa, Okla., entirely of pipe salvaged from an oil field near the town. The only other material used was wood planking for seats. The work was done by the WPA. After erection the stand was covered with aluminum paint.



READY to read the secrets of the structure partment with its powerful special diameters, the polished surface of a piece of as a printed page—grain size, cleanliness

From Roll Neck

AT LEFT

TO assure the necessary dense, hard, wearing surface combined with a tough and sturdy body to sustain the shock loads imposed on bearings in a steel mill, all Timken bearings are carburized. Soaking for nearly a week at white heat in a carbon rich atmosphere assures this.

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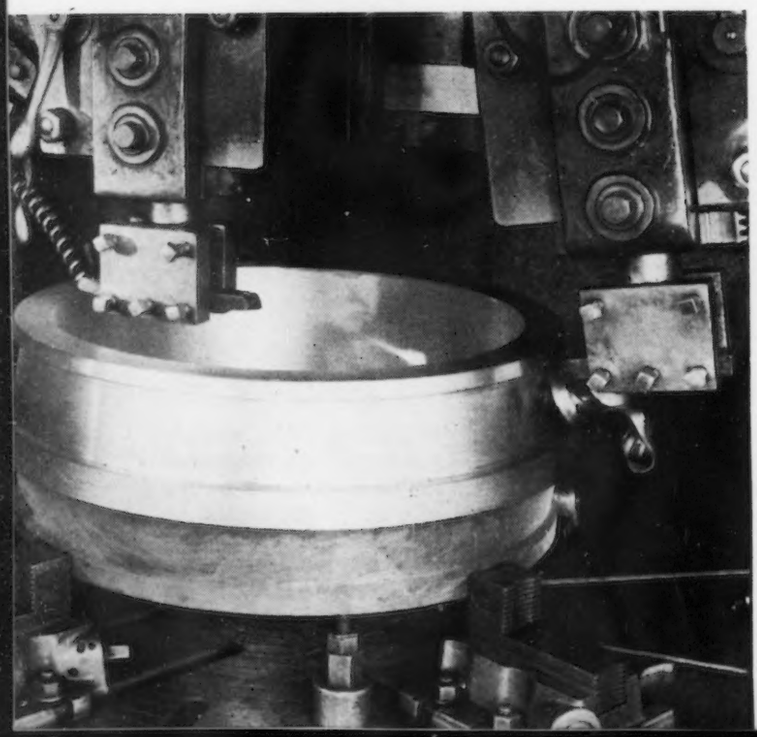
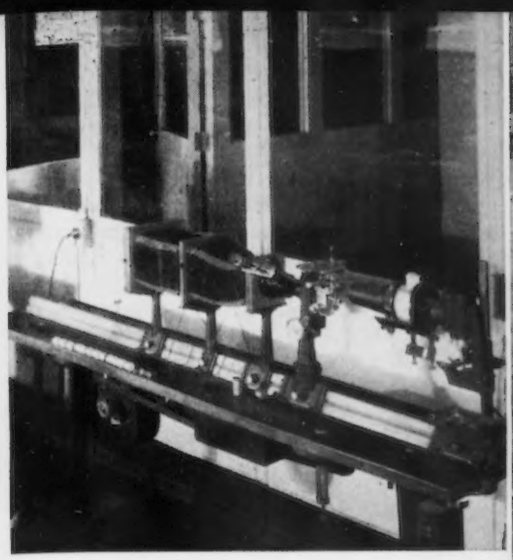
BELOW

ALMOST ready to go to the carburizing furnace is the roll neck bearing cone shown here being finish turned.

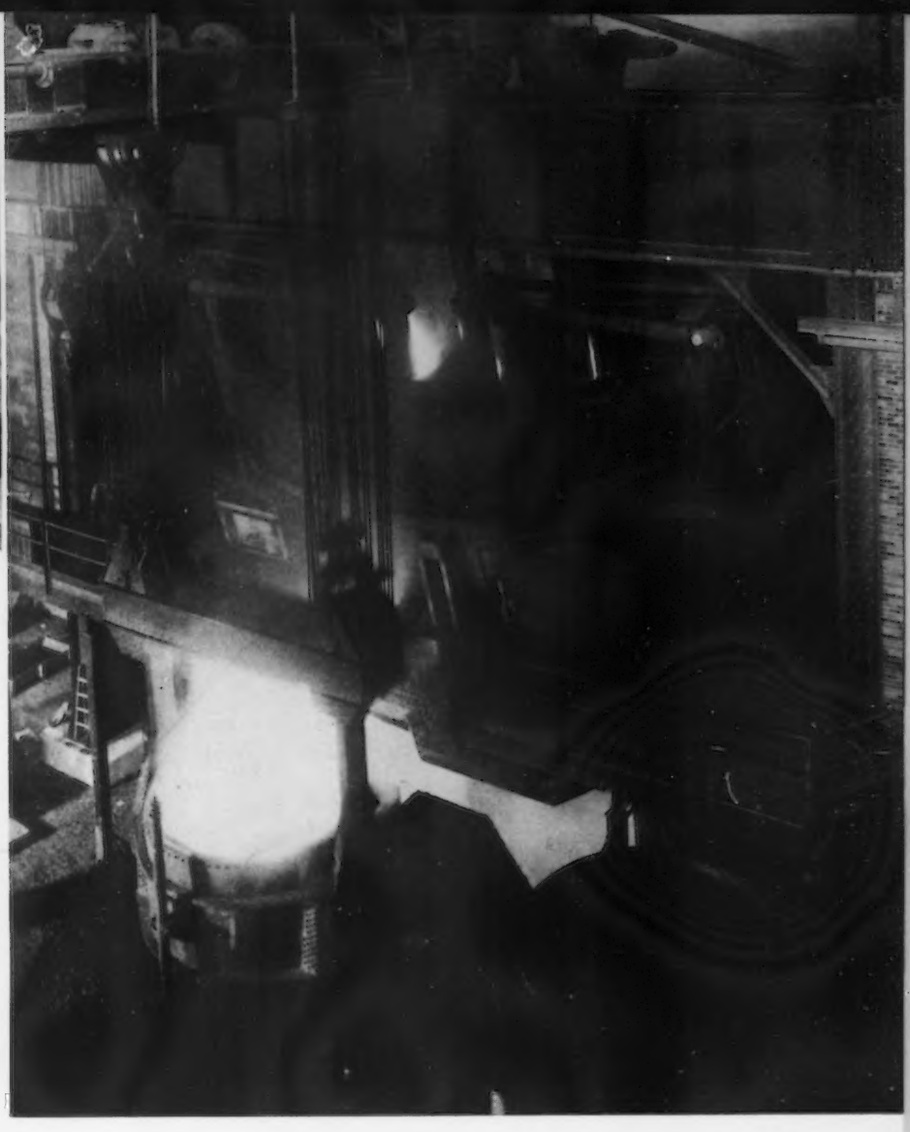


HERE we see one section of the laboratory, steel is checked. In direct communication telautograph, the chemical



of the finished steel is the metallurgical de-
microscopes. Magnified to 100 or even 1000
steel can be read by a metallurgist as easily
and uniformity are clearly shown.

Ingot to Bearing



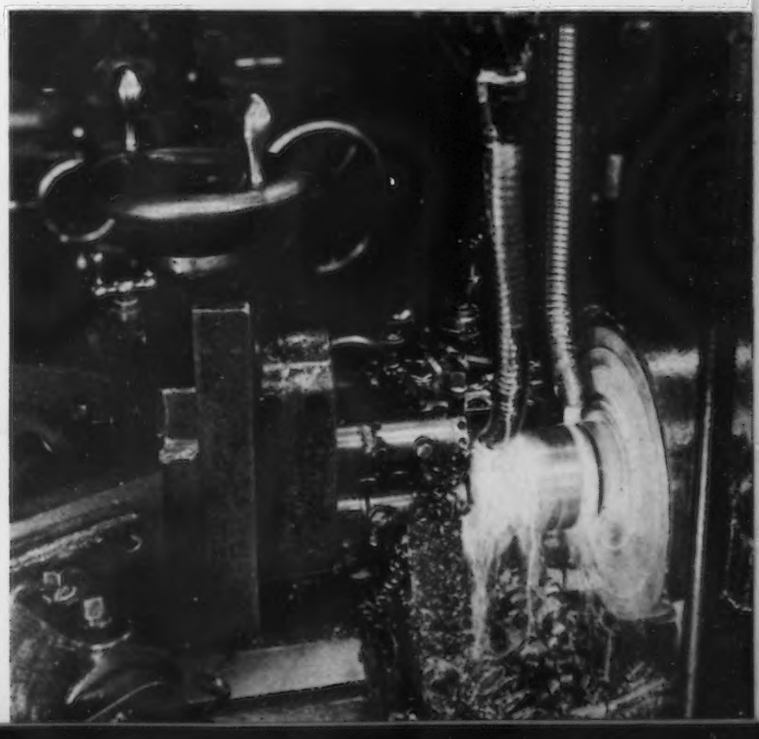
AT RIGHT

A THRILLING sight is the tapping operation when a heat of steel is being drawn from one of the world's largest electric furnaces, where 90 tons of high grade alloy steel is made in a single heat, day after day.

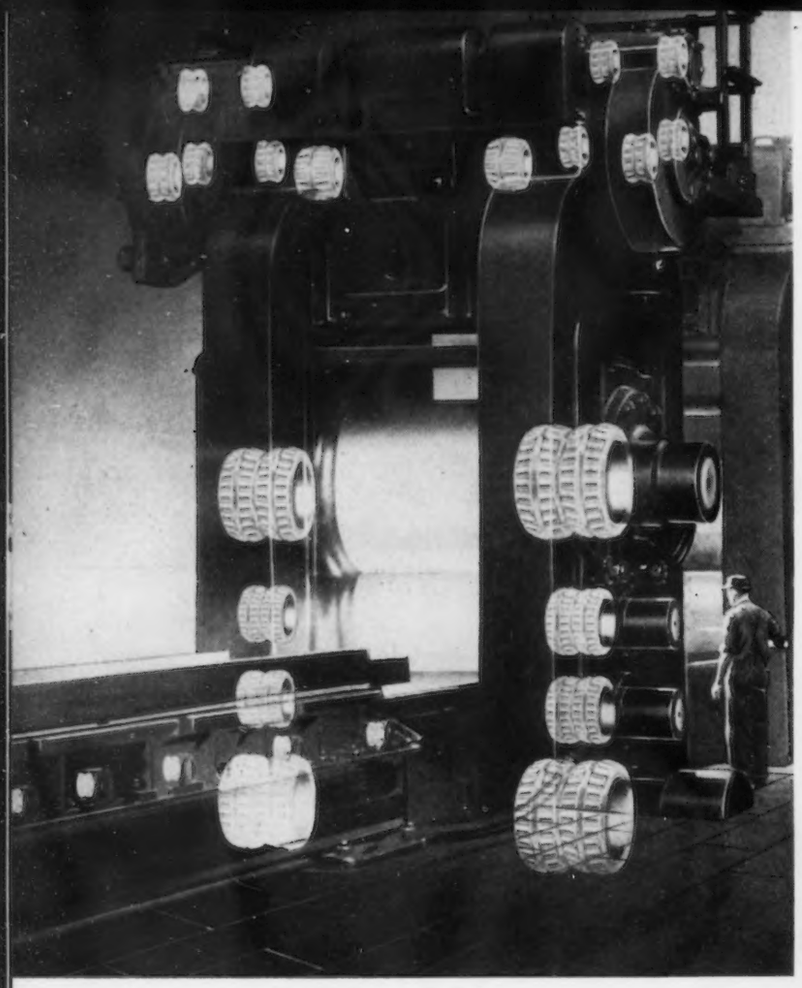
o o o

BELOW

WHEN even a single roll may weigh as much as 18 lbs., the loads to which they are subjected can readily be imagined. Here we see one nearing completion in a specially designed turret lathe.



where the carbon content of every heat of
with the melt shop by pneumatic tube and
laboratory functions day and night.



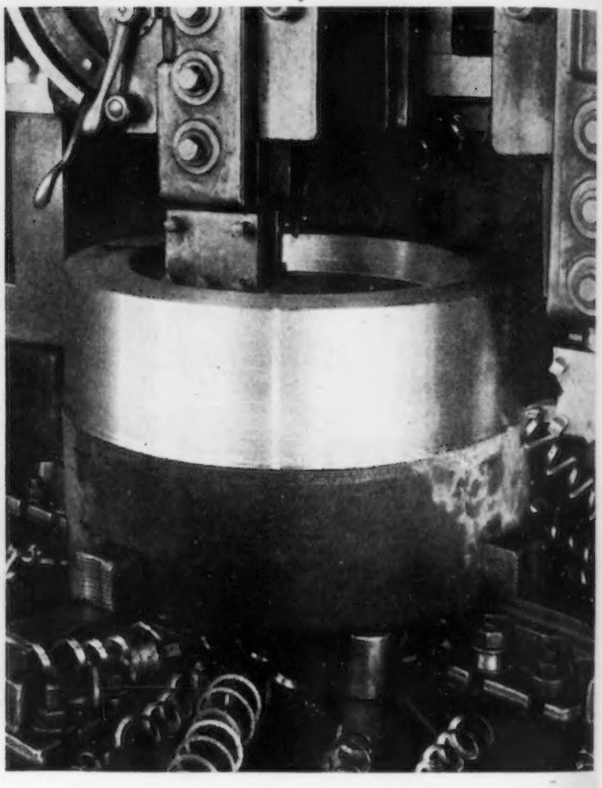
ABOVE

ONLY the mill builder ever actually sees all the bearings that go into a mill stand. But here we can see the many applications and relative sizes of Timken bearings as they are installed in hundreds of stands in strip mills.

o o o

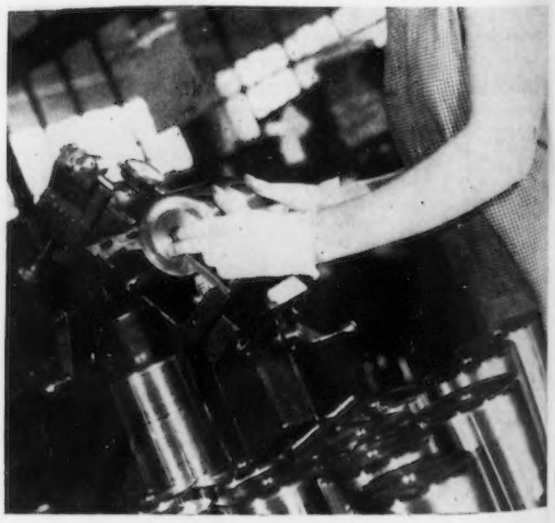
BELOW

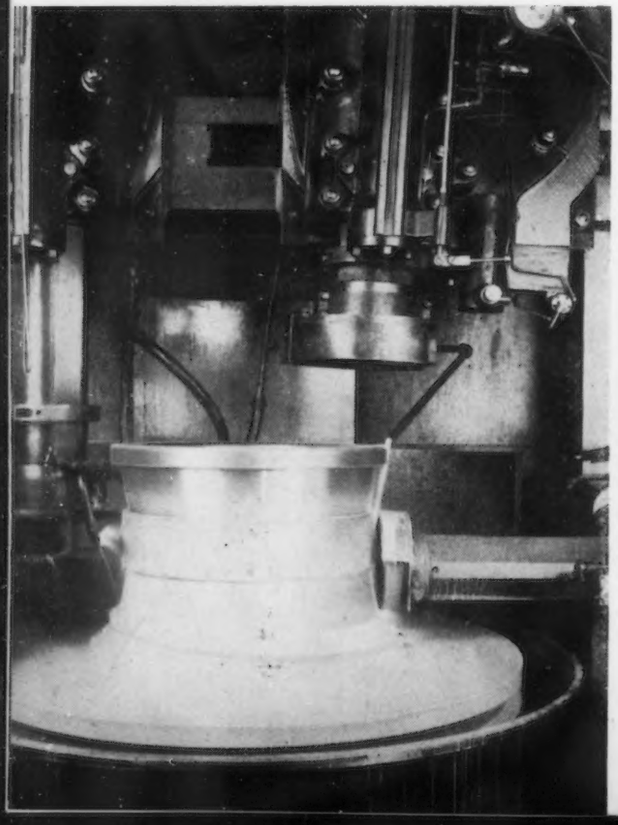
HEAVY duty equipment is required to shape up the tough, alloy steel, forged rings that are used for cups and cones for Timken roll neck bearings. Here we see the first step in turning up a cone which will weigh over a 1000 lb. when completed.



BELOW

EVERY individual roll is inspected in detail under a magnifying glass for scratches, flaws or imperfections. Then special gages reading in split tenths are used for checking its diameter while knife edge gages check its taper.





o o o

AT LEFT

HERE we see a special heavy duty roll neck bearing cone being finish ground in one of the special grinding machines handling pieces up to 60 in. in diameter and maintaining split thousandth tolerances.

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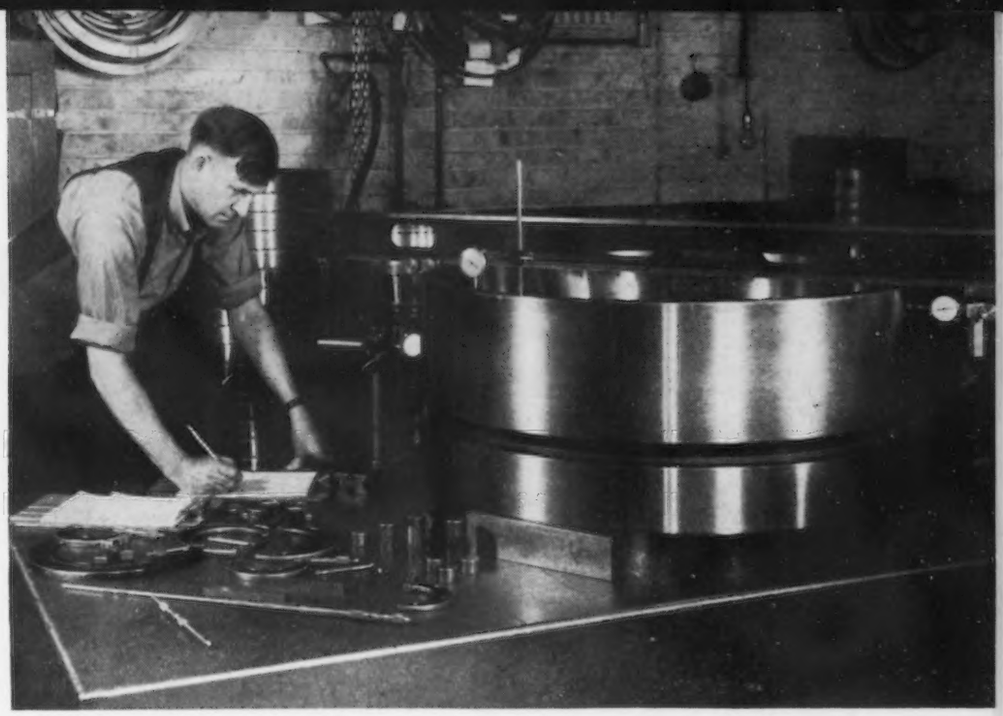
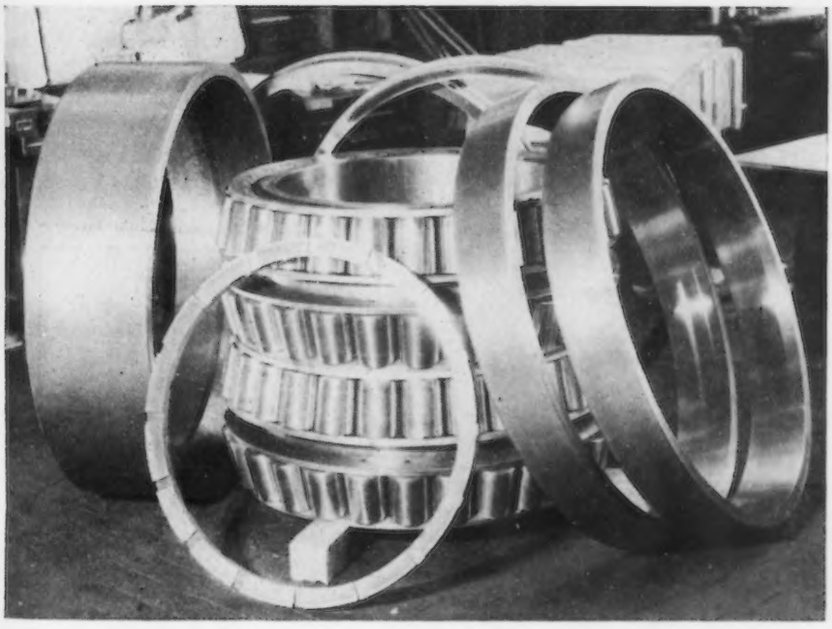
AT RIGHT

HERE we see one stage in the final inspection of a roll neck bearing. Special face plates, special micrometers, special bars and gages — all are utilized by the inspectors who pass or reject every mill bearing that leaves the plant.

o o o





o o o

AT LEFT

READY for installation on the neck of a back-up roll in one of the country's leading strip mills, the bearing shown here weighs 7,640 lb. Others weighing over 4 tons apiece are in service.

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AT RIGHT

IN the Timken physical laboratory is installed one of the largest bearing testing machines, where mill bearings up to 24 in. in diameter can be tested under radial loads of 500,000 lb. and thrust loads up to 200,000 lb. Here all theories are checked, all steels are tried out.

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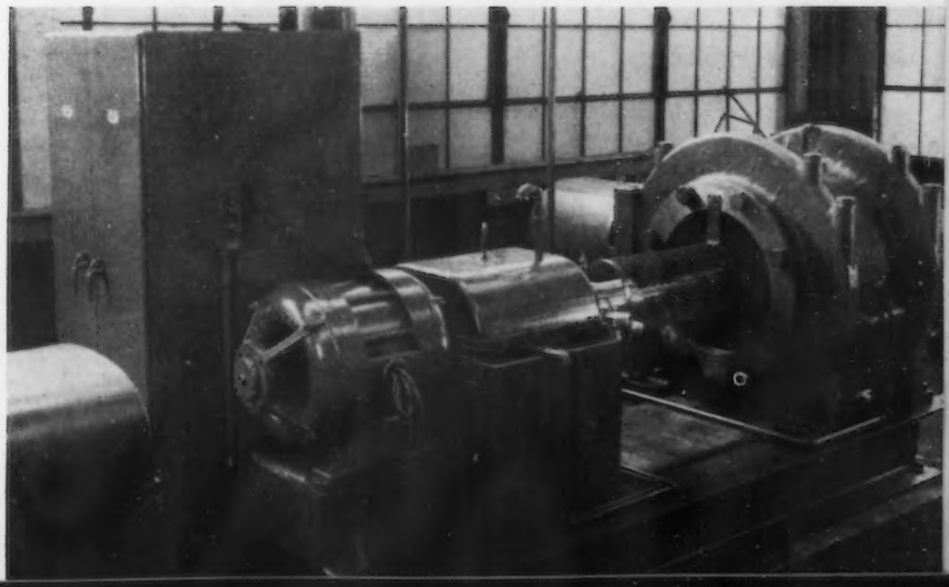

Characteristics of Variable Speed

CHAPTER 26 of a Series on the Economics of Industrial Power Transmission.

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IT seems proper at this point in our consideration of the mechanical phases of industrial power transmission methods and equipment to pause at the end of the description of *positive drive* methods, and before beginning the description of *resilient drive* methods, to examine a class of equipment which may be assigned to either classification, according to the design of the apparatus viewed. Variable speed transmissions range from the strictly positive characteristics of the chain drive to the resilient characteristics of the belt drive, the friction-disc drive and the hydraulic pump-and-motor combination.

There are many methods of providing variations in the speed of a driven shaft, falling into two general groups of mechanisms. The first provides a limited number of different speeds within a total speed ratio range, and includes step-cone pulleys, the gear-change box, and more recently, the multi-speed electric motor. The second class provides an unlimited (or "infinite") number of speeds within a total speed ratio range, and includes the whole field of truly *variable* speed transmissions, comprising essentially three basic operating principles; the expanding and contracting diameter cone-pulley drive, and friction-disc drive, and the hydraulic drive.

The discussion of variable speed transmissions in this and the following paper will be limited to these "infinitely" variable speed transmission mechanisms, for reasons which will be evident in the following paragraphs.

In the operation of certain industrial machines a definite, fixed speed may be satisfactory for all practical purposes. More and more, however, as machines are designed to accomplish either more complex operations, or are tied into a definite production schedule with other machines, an exact control of operating speeds becomes a matter of increasing importance, affecting both the cost and quality of production. For such machines, speeds which are too fast or too slow become inadequate and wasteful. Variable speed controls which permit an infinitely large number of speed change ratios between the driving and driven shafts, within definite upper and lower limits, make it possible to secure at any moment the one best operating speed for any machine, thus utilizing either its full capacity as a unit of equipment, or coordinating its functions perfectly with the other equipment in a production group.

The two broad functions of infinitely variable speed control in the industrial plant may be summarized therefore in these statements, first enunciated in the "Speed Control Handbook" published by Reeves Pulley Co., a pioneer manufacturer of variable speed transmissions:

1—To provide a complete range of speeds for the efficient operation of each type of production machine as an individual unit.

2—To permit accurate control of the flow of production through related units of machines, from department to department and through the production plant as a whole, so that congestion, confusion and lost motion may be definitely eliminated.

A somewhat picturesque idea of these two functions may be put into

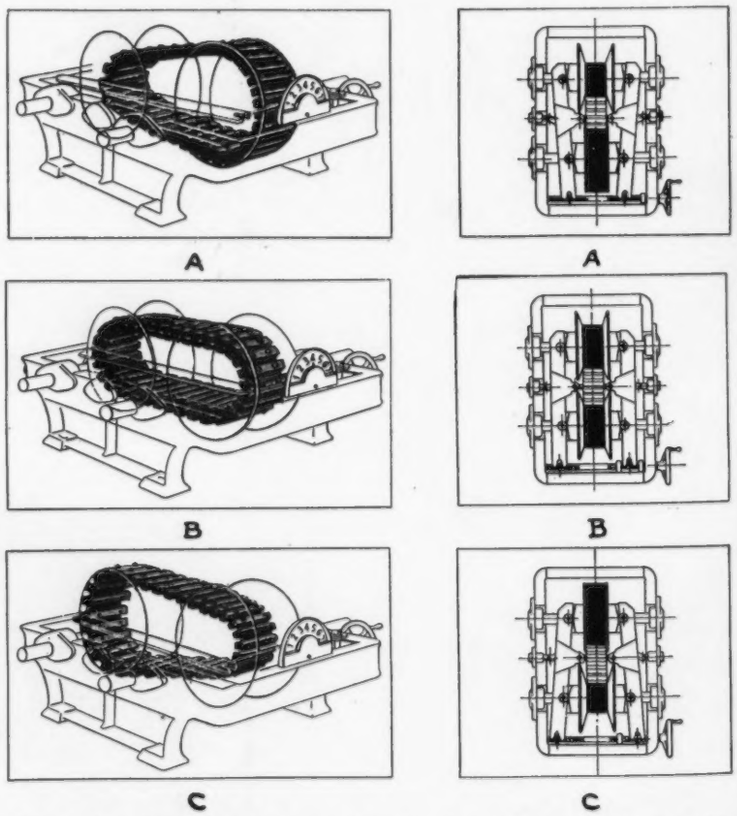

FIG. 1—Speed variations by means of varying diameter pulley mechanisms. "A" shows setting for minimum speed, "B" for mean speed and "C" for maximum speed. Diagrams courtesy Reeves Pulley Co.

Transmissions

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

the form of a musical analogy. The individual machine operating alone is like the soloist; performing best when free to select his own tempo. In the whole orchestra, however, there can be no soloists; each player must govern his actions in unison with all his fellow-players. Just so the individual machine geared to related production operations must have its tempo regulated to coordinate with the common effort. In either case, variable speed control permits each machine to produce at the most efficient speed, under the particular circumstances controlling the production schedule itself.

Seven Advantages

With infinitely variable speed control there are seven specific advantages available, some or all of which are factors in practically every phase of industrial production:

1—Variable speed control makes it possible for a single machine to produce uniform work over a greatly increased operating range, on different sizes, shapes or grades of material.

2—Variable speed control makes it possible for a single machine to produce uniform work in spite of changes in composition, molecular construction, density, or character of material during the processing operation; providing adequate compensation for changes in consistency, density, viscosity, coagulation or the congealing of the material handled.

3—Variable speed control makes it possible to compensate for variations in temperature, humidity, moisture content or other atmospheric conditions by varying the time of heating, baking, drying, cooking, annealing, cooling or chilling of product.

4—Variable speed control accommodates changes in production schedules by varying conveyor speeds or by providing the necessary flexibility of machine operating time to coordinate related processes.

5—Variable speed control provides constant changes in peripheral speed of the product whenever required, thus

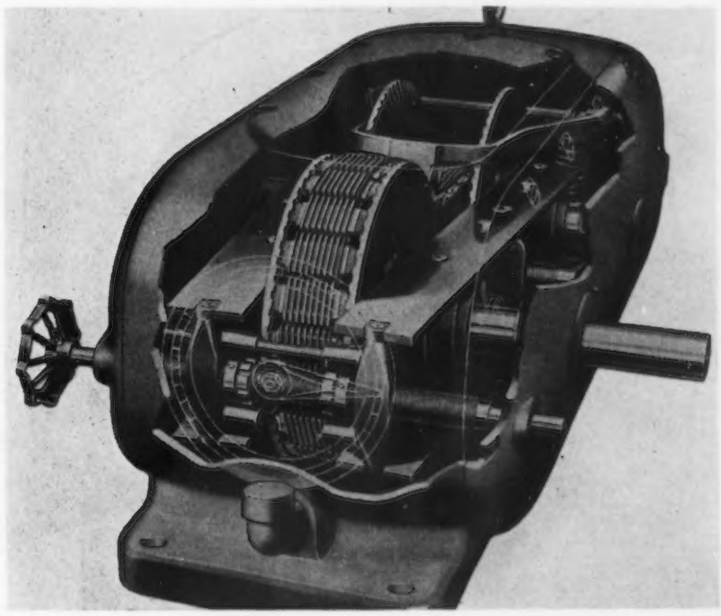

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FIG. 2—Phantom view of Link-Belt P.I.V. gear, showing construction of side-toothed chain and slotted variable diameter pulleys, providing positive mechanical engagement of driving members.

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FIG. 3—Two open type Reeves units, one with automatic control, are coupled together to drive a paper unwinder requiring a constantly varying speed control.

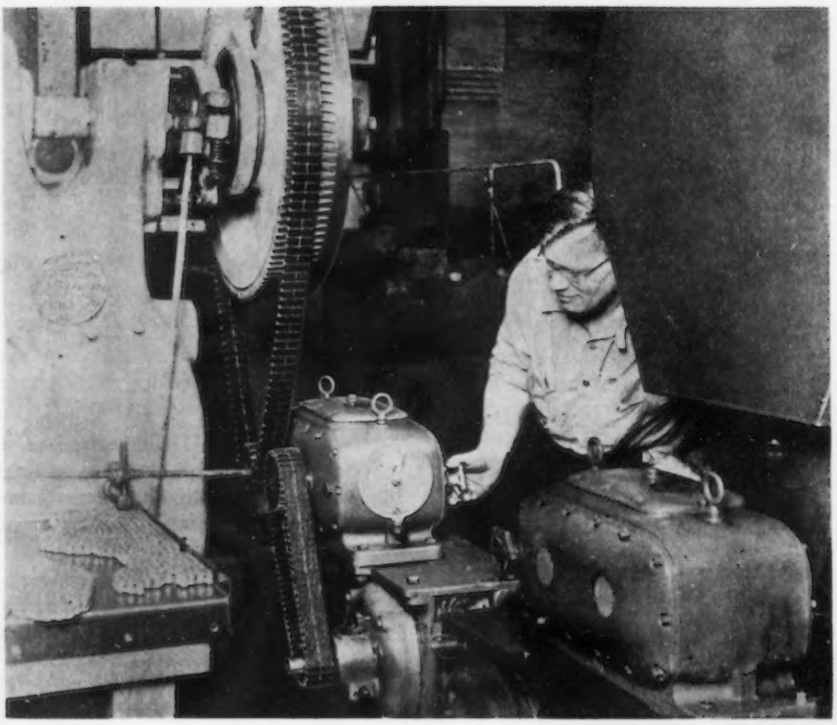

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FIG. 5—Upsetting presses at Indianapolis plant, Link-Belt Co., equipped with Link-Belt P.I.V. and silent chain drives. The P.I.V. drive is used to vary the strokes of the presses in relation to the size of work going through.

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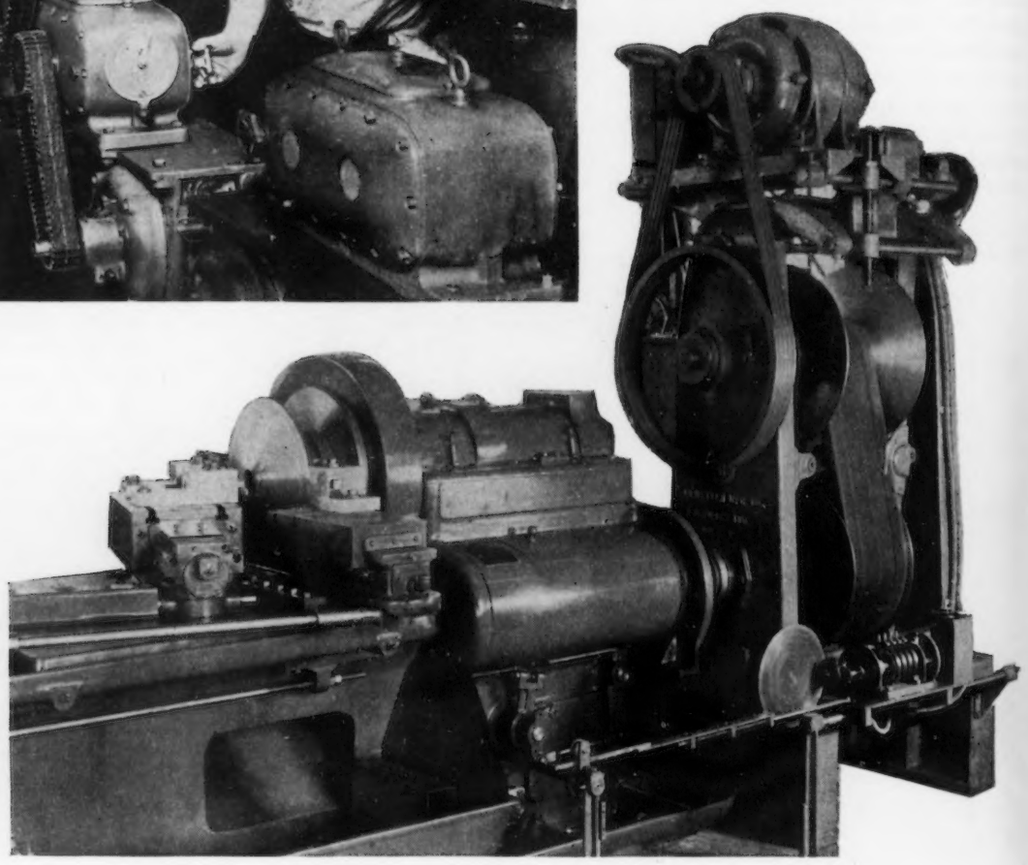
FIG. 4—Lewellen transmission with automatic electrical control, driving Simplematic lathe facing the cone-shaped pulley disks of a Lewellen drive.



maintaining uniform peripheral speed on an increasing or decreasing diameter to insure uniform cutting speed on rotary veneer lathes, or uniform winding speed on paper or cloth or cable winding reels or drums.

6—Variable speed control makes possible the synchronization of speeds of various parts of the same machine, or of several machines operated in series, permitting a continuous flow of materials to run from one process to another, eliminating material waste and insuring high quality uniformity of product.

7—Variable speed control compensates for variations in the number or skill of machine operators; adjusting the speed of operation to the diverse demands of the human element to provide the maximum machine utilization-factor under the existing conditions of employee machine-attendance.

Machine Efficiency

There are two factors which affect the basic efficiency of machine operation, both of which are in turn affected by speeds of operation. A simple example will make these factors . . . and their relation to production as a whole . . . clear. If a given machine, operating under ideal conditions, draws a load of 10 horsepower, but under the existing conditions of operation only draws an average load of 8 hp., the *load-factor* of that machine, as it is used, is said to be 80 per cent. It is evident that, if the speed of that machine could be effectively increased, the work done would be more, the load carried would be greater, and therefore the load-factor would be nearer ideal conditions.

Again, if that machine, under ideal conditions, could be made to operate 10 hours per day continuously, but the actual total operating time amounted to only 8 hours, the *utilization-factor* of that machine, as used, would be 80 per cent. Ordinarily, if the total amount of work to be done by that machine remained the same in any

one day, increasing its operating speed would tend to lower its utilization-factor, since the work would be turned out faster. But if the amount of work coming to that machine is dependent upon the speed of operation of other, related machines in the production unit, increasing the speeds of operation of those other, related machines would tend to bring more work to the machine under consideration, and hence makes possible an increase in its utilization factor to a point nearer ideal working conditions.

Since the efficiency of the machine is the product of its load-factor multiplied by its utilization-factor, in this particular example the machine, as used, has an efficiency of .80 x .80, or 64 per cent. That is, the machine is doing 64 per cent of the work it might be doing under ideal conditions. Now, if the speed of the machine itself could be increased so that its load-factor were raised 10 points, to 90 per cent, and if the speed of the related machines in the group was raised so that more work came to the machine during the day and its utilization-factor was likewise raised 10 points, to 90 per cent the overall efficiency of the machine would then be .90 x .90, or 81 per cent. Thus, a raise of 10 points in load-factor and of 10 points in utilization-factor produces an increase in machine efficiency, which figures out as almost 27 per cent more work from that single machine every working day!

It must be evident, therefore, that for every machine there is, under the conditions of service governing its operation, a best and most economical speed of operation; and that it is most likely that the best and most economical speed of operation at, say, 10:23 o'clock in the morning may not be the best and most economical speed of operation at, say, 2:47 o'clock in the afternoon. Fixed speed operation is, at best, a compromise between all the conditions which affect operation; variable speed control permits management to take advantage of these varying conditions to do more work and better work at less cost. And, since variable speed control is far from costly, its economic advantages quickly pay for the expense of its application.

"Infinitely" Variable Transmissions

A—*Variable Diameter Pulley Types.* The first commercially successful infinitely variable speed transmission was developed from the principle that a pulley of large diameter mounted on a constant speed shaft will cause the belt running over it to move faster than a pulley of small diameter. By making the pulley in two equal cone-shaped parts, and mounting each of the two parts on the shaft in such a way that they could be pushed apart or brought together, the sides of the belt in contact with the cone-faces of each part could be made to ride at varying distances from the center of the pulley shaft. Thus, at will, the effective diameter of the pulley could be decreased or increased. Using a belt of constant length running over two such variable diameter pulleys (one on the power input shaft, the other on the power output shaft) so linked that when the effective diameter of one pulley was increased the effective diameter of the other pulley was decreased proportionately, or vice versa, an infinite variation in the speed

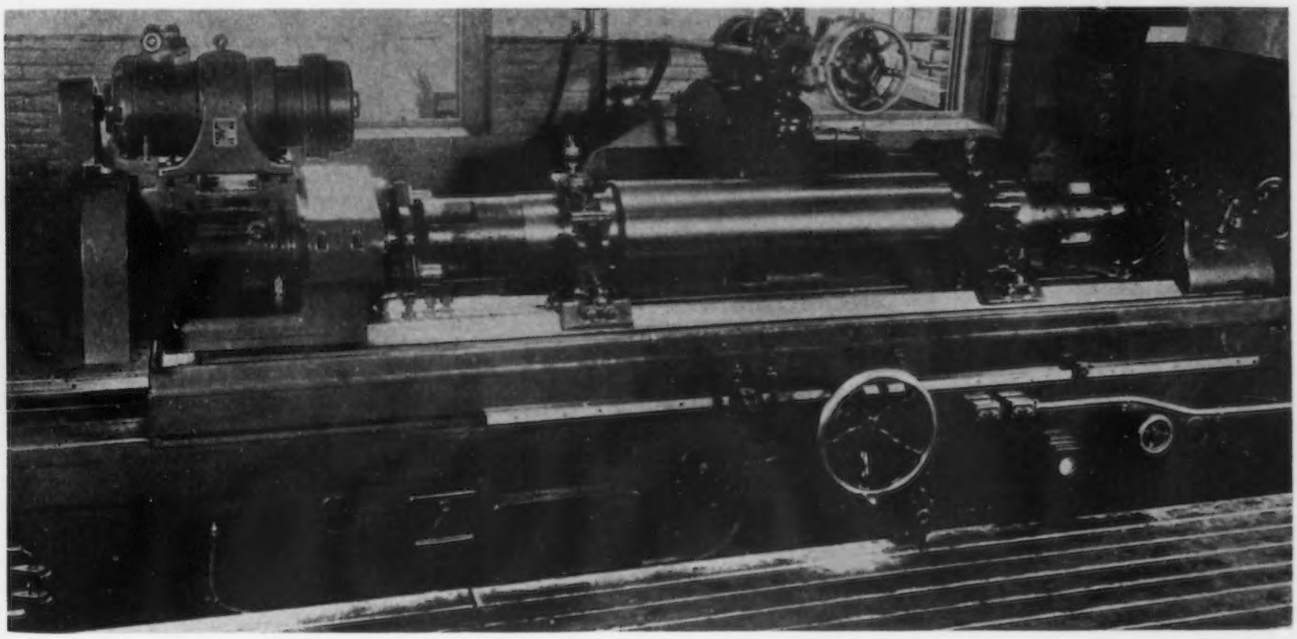


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FIG. 7—Transitorq driving the main spindle of a Landis roll grinder.

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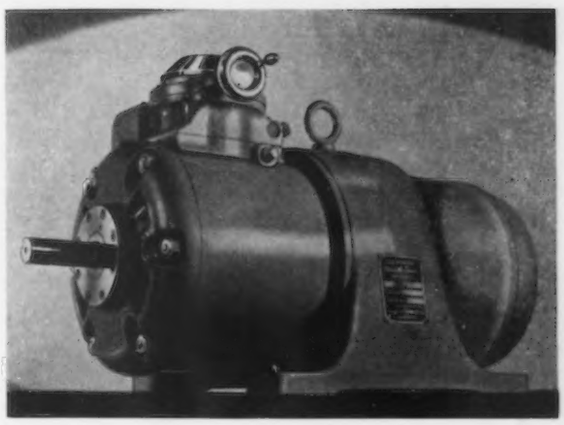
FIG. 6—New Departure Transitorq; combination of motor and variable speed transmission.



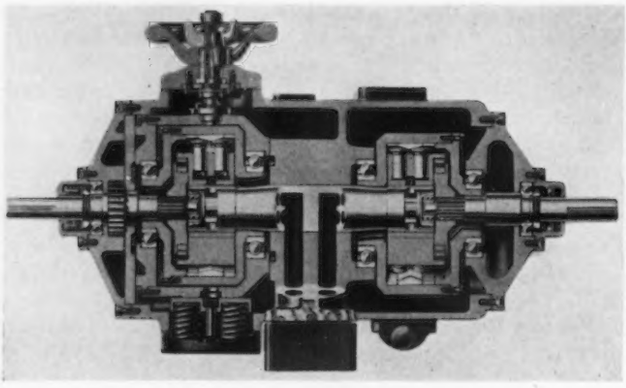


FIG. 8—New Oilgear hydraulic variable speed transmission unit. Cut-open plan view showing relations between variable displacement pump and constant displacement motor.

ratios of the two shafts was obtained, within the total variation limits of the two pulleys.

The cone-shaped discs which make up the separate halves of each pulley are turned to smooth faces, from semi-steel. The belt is fabricated with a core of heavy, twisted cords sealed in rubber compound and covered with canvas. On this belt are fastened, at short, regular intervals, transverse blocks of hardwood, tipped at each tapered end with pieces of leather. The shape of the taper at each end of the blocks corresponds with the slope of the cone-discs. It is these blocks, and not the belt itself, which makes frictional contact with the cone-discs of each pulley.

As typified in the Reeves and Lewellen transmissions, this equipment has the essential characteristics of a "resilient" drive; that is, the transmission of power is a function of the frictional grip between belt-blocks and pulleys, not on any mechanical interlock of opposing gear members, and the belt is formed of a partially elastic material. Under all normal load conditions the transmission of power is positive in the sense that it is without slip or stretch of members. But should a heavy shock load of damaging proportions be suddenly applied to the driven, or output shaft, the belt is sufficiently resilient to stretch slightly, and, as in all frictional drives, the grip of the belt-block leathers on the smooth faces of the pulley cones will slip, so that the shock is absorbed without damage to the drive mechanism.

The basic principle of the varying diameter pulley has been adapted to a truly positive drive in the Link-Belt P. I. V. gear. Here the belt becomes a metal chain, with teeth at the sides, and the smooth-faced cone-shaped halves of the pulleys become radially slotted cones, in which the side-teeth of the chain engage. The P. I. V. gear is therefore a special, variable speed transmission case of the positive chain drive; with a mechanical interlock between the chain and the pulley faces, instead of frictional grip, and a chain of non-resilient metal.

The Link-Belt V. R. D. transmission, made only in fractional horsepower rating, embodies a compromise between the friction-grip and the gear-mesh principles. In a mechanism of all-metal construction, the variable diameter pulleys are smooth-faced, but the transmitting medium is a non-elastic metal chain in the sides of which are carried rollers placed with their axes of rotation at 90 degrees to the radii of the cone-faces of the pulleys. The chain is therefore free to ride up or down the cone-faces as the pulley diameter increases or decreases, but they are not free to move in the direction of the chain pull. The friction grip is metal-to-metal, and slip is possible under conditions of suddenly imposed shock load; hence this drive must be classified in the resilient group.

In all transmissions of the variable diameter pulley type speed variation is had by actuating a link-motion serving to draw one pair of pulley cones together as it pulls the other pair of pulley cones apart. Accompanying illustrations show the details of operation of the Reeves transmission, and the working assembly of the P. I. V. gear.

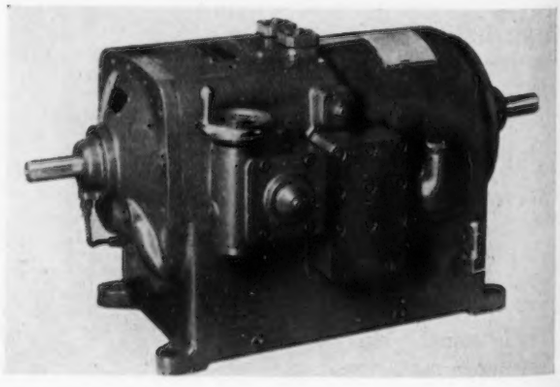


FIG. 9—The new Oilgear hydraulic variable speed transmission unit is compact. This is the outer view of the mechanism shown in Fig. 8.

The Transitorq

B—*Friction-disc Mechanisms.* Long before the days of the early automobile friction-disc drive, in which the edge of one disc rolled on the flat surface of a second disc placed at right angles to the first, and speed variations were achieved by shifting the edge-contact of the first disc closer to or further away from the center of the surface of the second, inventive geniuses spent many weary hours on the problem of evolving a commercially successful friction-disc variable speed transmission. Only recently has success finally crowned their efforts. Today, in the New Departure "Transitorq" such a device is available, as yet in limited capacities. Actually the Transitorq is an integral combination of motor and variable speed transmission, with the motor shaft directly coupled to the transmission input shaft. It is to be classified as a "resilient" drive, since the transmission of power from the input to output shafts depends upon frictional grip between metal surfaces which are smooth, and hence permit slip under shock loads, and do not in way depend upon any mechanical interlock of tooth-shaped members. Because of this frictional grip, any sudden, sharp stress will cause the transmitting members to slip, and thus avoid damage to the drive mechanism, or the driven machine. Such stresses as are not immediately absorbed by slip are transmitted back to the motor, where additional slip between the rotor and the stator provides additional safeguard. Thus the shock-absorbing characteristics of the Transitorq (or of other drives of somewhat similar principles, such as the Graham Transmission described in THE IRON AGE of Jan. 7, 1937) require the classi-

fication of friction-disk drives as "resilient."

The operating principle of the Transitorq is the same as the old automobile transmission, but the details are, of course, quite different. Between two hardened steel, curved-face discs, one mounted on the input shaft and the other on the output shaft, roll three hardened steel rollers, mounted in a non-rotatable spider in such a way that the angle of contact of the rollers with the facing discs may be varied. The highest ratio of speed change is obtained when the rollers are in position to contact the driving disc along the surface furthest from the shaft center, and the driven disc along the surface nearest the shaft center. The opposite positions of the rollers produces the lowest ratio of speed change. When the rollers are at right angles to both discs, and hence contact both surfaces at points equidistant from both shaft centers, the ratio is 1 to 1. The position of all three rollers is changed simultaneously and uniformly by turning a handwheel mounted outside the transmission casing.

Since the transmission of power by this principle depends upon the pressure of the rollers on the discs being kept proportional to the torque loads, an essential feature of the Transitorq is an automatic pressure device which utilizes the imposed torque load itself to generate and maintain the required pressure between the rollers and the discs. This device sensitively maintains this pressure regardless of the character of the load. With an 1800 r.p.m. motor speed, the Transitorq will deliver output shaft speeds throughout a range of 600 to 3600 r.p.m., with an unlimited adjustment of intermediate speeds.

Hydraulic Transmissions

C—*Hydraulically-actuated Variable Speed Mechanisms.* Several of these devices are available, each depending on the principle of a practically incompressible fluid being pumped by a variable displacement pump to a constant displacement fluid motor, or by a constant displacement pump to a variable displacement motor. In either case, the speed variation is obtained by altering the stroke of the pump or the motor. Generally, the pump and the motor are separate units. In the new Oilgear transmission unit, however, both are integral parts of a single mechanism. In describing this unit, the general principles of operation of all hydraulic variable speed transmissions may be expounded.

In the Oilgear unit both the pump and the motor are identical in construction, with the exception that provision is made to move the rotor section of the pump from side to side, and thus to alter the length of stroke of the pistons, and the direction of flow of the liquid pumped. Thus, by variations of the piston strokes the amount of fluid pumped to the motor is controlled, and therefore the speed of the motor; likewise the direction of flow to the motor is controlled, and therefore the movement of the motor shaft backward or forward. The motor piston travel is not adjustable.

In both the pump and the motor the eccentric position of the rotor with respect to the containing cylinder and the drive shaft causes pistons radially placed in the rotor to move in and out with respect to the drive shaft, alternately sucking fluid from centrally located ports, and pushing that fluid out through other centrally placed ports around the drive shaft. Thus in the pump rotation of the rotor causes the fluid to be pumped under pressure to the motor; in the motor the pressure of the fluid causes a similar rotor to rotate. The fluid used is a high grade lubricating oil, and the moving parts of both mechanisms are so constructed that a small amount of leakage of this oil is permitted all around them, serving as the lubricating medium as well as the power transmitting medium.

Operating characteristics include steplessly variable speed in either direction, smooth, controlled acceleration or deceleration in either direction, smooth reversal of rotation and active response to hydro-dynamic braking.

(TO BE CONTINUED)

An Analysis of the Grinding Process

(CONTINUED FROM PAGE 30)

jelly to 40 gal. of water to be a satisfactory starting mixture for coolant purposes. It is cheap, and can be seen through quite readily. As a production coolant it has been fairly extensively used.

Other conclusions of the author are: In cylindrical grinding with power traverse, the requisite openness of wheel structure required for optimum results increases with traverse speed. If traverse rate alone be increased, the resulting greater chip volume per grain stimulates wheel heating, while the more attenuated chip wedge encourages work heating as the grains dull.

This whole business is a study of transients. The grains dull, tending to heat the work and increase the force required to cut until the duller and less well supported ones leave the wheel. These things increase the duty on the good grains remaining, the keener ones of which cut freely and tend to run cooler. But there are fewer of them, as the wheel is slowly growing out of round, so they have each heavier duty and the whole cycle of inter-related dulling, heat production, wear and breakdown is cumulative at increasing rate with time.

Since the bond may weaken with increased temperature, and its *effective* strength certainly reduces as less of it is available for usefully supporting such grains as are in action, the effective strength *must* become lowered as time goes on. Further, since the force per remaining active grain increases with time, the necessary strength to maintain cutting at the demanded volume removal rate must go up. In an *ideal* application, once the wheel is dressed, its self sharpening tendency due to breakdown should just compensate its dulling tendency due to work done, and such a wheel could, in theory at least, go on with no dressing until quite worn out.

Harry W. Dietert Co., Detroit, has entered the field of spectrographic equipment. The firm will maintain a laboratory with a staff qualified to determine what use prospective customers can make of spectrographic analysis and will train the customer's technicians in its correct operation. The instrument for which this firm has exclusive eastern and mid-western sales rights is the Applied Research Laboratory Spectrograph. It is of the grating type with an arc or high voltage spark gap to volatilize the metal being tested. It is applicable to industrial control and research problems involving qualitative and quantitative analysis of ferrous and non-ferrous metals. It is used with a projection comparator and a photo-densitometer.

Bicycle Tubing Welded by the Hart Process

A RADICALLY new and effective technique of welding bicycle frame tubing by an accurately timed resistance welding process is being employed by the Cleveland Welding Co. Quite as essential as the five welding machines installed for this work are the method and equipment for reinforcing the tube ends and for milling or scarfing the ends so as to avoid flash and develop full strength of the welds.

Attracted by the revival of bicycle sales, this Cleveland company entered the field two years ago, seeking to place its production on the same basis as its automotive and other high production items. Bicycles were returning to popularity after a long period of reduced sales, following the production peak of some 1,500,000 units in 1906. Last year, the industry sold over 1,000,000 bicycles, and expects to do as well this year.

For years known for its conservatism, the industry had slowly replaced dip brazing by torch brazing and welding, but with the increase in demand, producers found it necessary to revise their practice radically and to take full advantage of modern design and recent developments in metallurgy and fabrication of tubes. Today, conveyors, special automatic machines, modern enameling equipment and the latest developments in welding are being used.

The welding process, known as the Hart process, covered by U. S. Patent No. 2,091,982 and other patents pending, exclusive rights to which are owned by Steel & Tubes, Inc., Cleveland, subsidiary of the Republic Steel Corp., is a process of joining two tubes or a tube and another article by means of electric resistance welding to form a joint that is sure, strong, and without any external flash to be removed afterward. The Cleveland Welding Co. operates under a license from Steel & Tubes, Inc.

The Hart process consists essentially of three major steps: Reinforcing the tube ends; preparing the tube ends for welding; and welding.

To obtain the maximum strength with light gage tubes, it is necessary to reinforce the ends of the tubes to provide greater wall thickness for the welds. If the tubing has a comparatively heavy wall, or if the maximum strength is not necessary, reinforcing is not required. Reinforcing is done by expanding the end of the tube slightly for a distance of 1 to 1½ in. by means of a punch. Into this expanded end a reinforcement is placed. In bicycle construction this is generally a tube of about 14 gage material, with a heavy cross knurl. After the reinforcement is placed within the tube, the tube is pressed through a die, drawing the end of the tube down over the knurled reinforcement to the original diameter in such a way that the points of the knurl are firmly imbedded in the inner wall of the tube. This makes a very fine mechanical and electrical connection between the tube and the reinforcement. This reinforcement provides a heavier wall at the end for welding and distributes the stress away from the actual joint.

Fig. 1 is a photograph showing steps in the reinforcing process.

In production this reinforcing is done in the special automatic machine shown in Fig. 2. This machine, developed specially for this purpose by the Taylor-Winfield Corp., Warren, Ohio, is fully automatic. Tubes to be reinforced are placed in a rack at the right hand end of the machine and the reinforcements are loaded into a hopper. The operation of this machine can best be explained by tracing the progress of one tube. The tube drops into guides and is moved forward through a die, then an indexing mechanism carries it forward one station, in which position a punch expands the end of the tube. It is then carried into the next position, where a second punch places an insert in the expanded end of the tube. It is then indexed to the third station, where a plunger forces the tube reinforcement back through the die, drawing the tube down to the original diameter. All three punches are carried on a single hydraulic ram so that at each stroke all three operations are performed. The indexing is controlled by a geneva movement and the complete operation results in one finished reinforced tube end with each stroke of the hydraulic plunger.

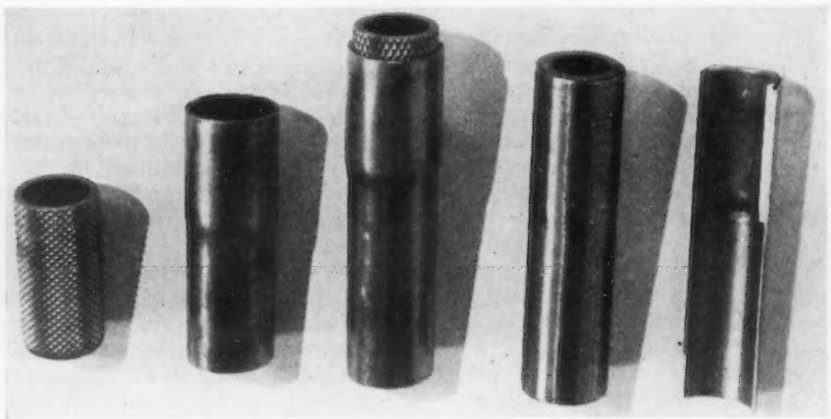


FIG. 1—From left to right: Knurled reinforcement, tube expanded for the reinforcement, reinforcement placed within the expanded tube end, tube drawn down over the reinforcement, and a section of the reinforced tube end.

The second step in the process is to machine the reinforced tube end in such a manner that a line contact is made at the inner edge of the tube only, leaving a small wedge shaped space extending away from this line contact to the outer edge. This contour is made very simply with a special high speed form milling cutter. Milling is done in a special semi-automatic machine which mills two ends simultaneously. Fig. 3 shows this milling machine set up to machine the tube which runs from the crank hanger to the head. With this machine it is merely necessary to place the tube within air operated clamps (not shown in photograph) and press a button. The tube is clamped in position, the two heads move up at high speed almost into contact, then a slow feed comes into play during the actual milling, at the end of which the two heads return and the clamp opens. This machine is capable of handling approximately 700 milled ends per hour, and, as can be readily seen from the photograph, is extremely universal in its application. The set-up shown is merely typical.

The third step in the process is to bring the machined tube end in contact with the mating part under heavy pressure and apply a very high current for a short time. In bicycle construction the pressure is approximately 1 or 2 ton; the instantaneous demand is 150 to 250 kva. during weld and the time interval 4 to 10 cycles of a 60-cycle current. This is accomplished in special press welders of the type shown in Figs. 4 and 5. Fig. 4 shows the type welder used for the crank hanger. The crank hanger tube is placed over the horizontal mandrel, and the tube to be welded to it is clamped vertically by the Elkonite-faced jaws directly under the mandrel. When the parts are in position the button is pressed and a small horizontal air cylinder operates to locate the vertical jaws on the centerline. Another air cylinder operates to clamp the vertical tube by means of a toggle. Air is then admitted to the cylinder at the top of the machine, and the roller bearing head comes down, applying the pressure between the parts to be welded. The current is turned on by an electronic control for the desired length of time, and the cycle reversed. This entire cycle occupies from 2 to

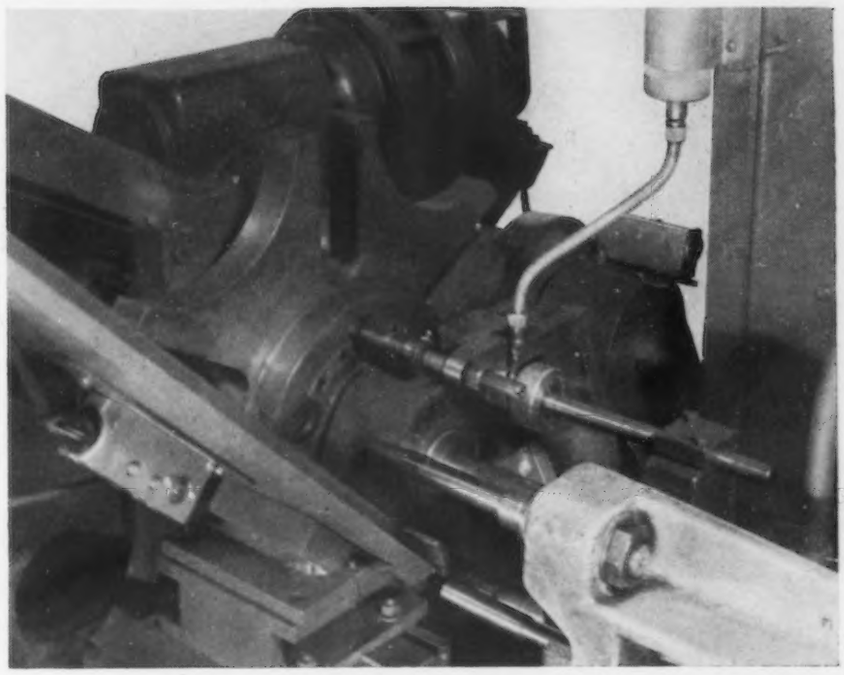


FIG. 2—Detail view of reinforcing machine showing geneva movement and hydraulic ram with three punches.

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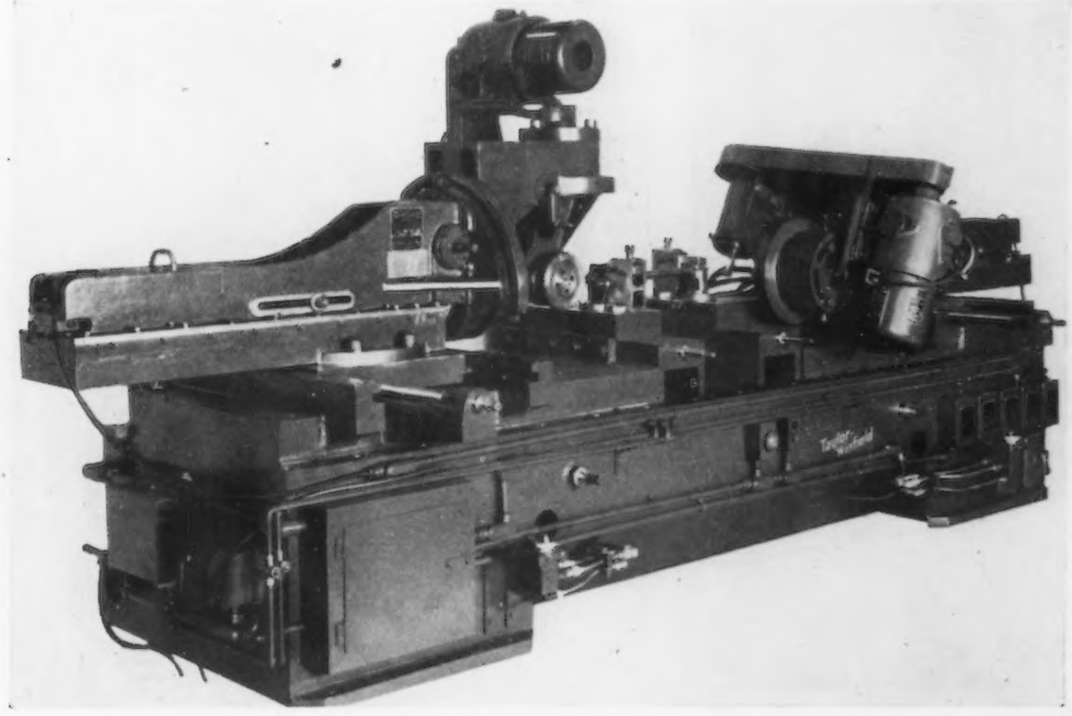

FIG. 3—Semi-automatic milling machine set up for milling the wedge end on the tube that runs from the crank hanger to the head.

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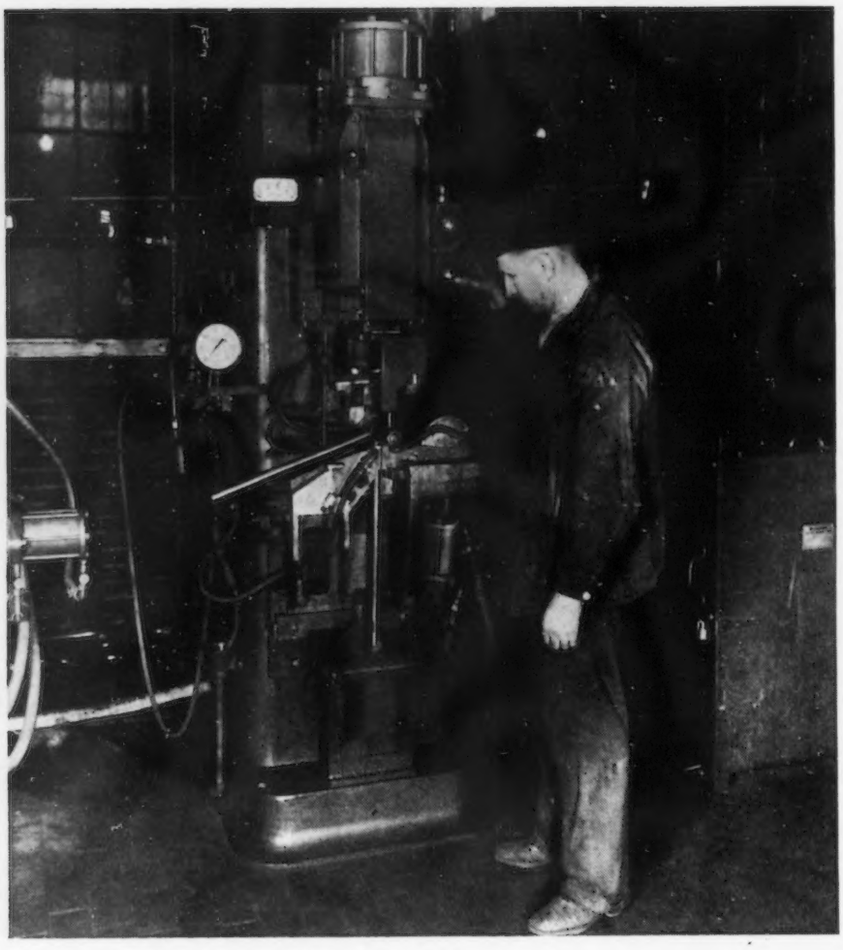
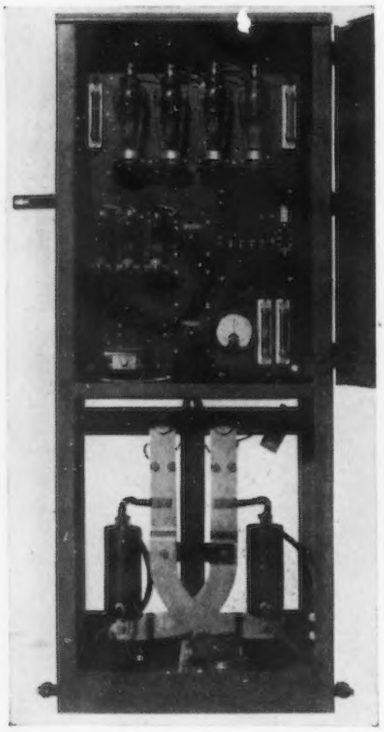


FIG. 4—Special press welder with roller bearing, air operated head for crank hanger joints.

3 sec., depending on the type of joint being made.

The welder shown in Fig. 5 is used for joints similar to the head joint, where a mandrel is not placed within the tube. Its operation is similar to that described above except that the head is motor driven.

Timing is provided by a Westinghouse Ignitron timer, shown in Fig. 6. Closing and interrupting the current is performed by electronic tubes and timing is in terms of electrical cycles, and half cycles. With a 60-cycle current, this means that welds can be timed from 1/120 sec., or any multiple to ½ sec. or longer. Two Ignitron power tubes, each conducting current in only one direction, close and interrupt the welding current. The effect is that of a single pole, single throw switch, synchronized with the current supply. Ignitron tubes contain no filament, hence there is nothing to burn out, and the current is carried in an arc through mercury vapor. In addition, a heat control is supplied whereby the magnitude of the welding current can be varied from 20 to 100 per cent of maximum current by means of a small dial, thus avoiding auto-transformers, primary taps, and tap changes, and providing a smooth, stepless current adjustment. This heat control unit is small and is



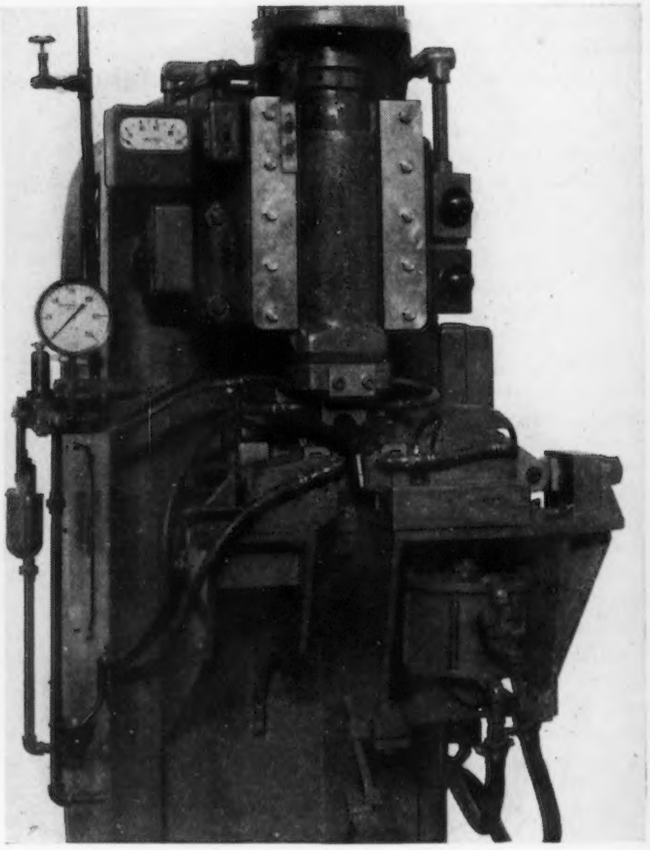
AT LEFT

FIG. 6—Electronic timer for press welders, providing time intervals from 1/120 to ½ sec., with 60-cycle current.

o o o

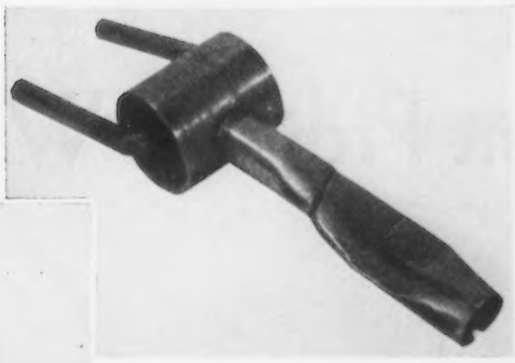
AT RIGHT

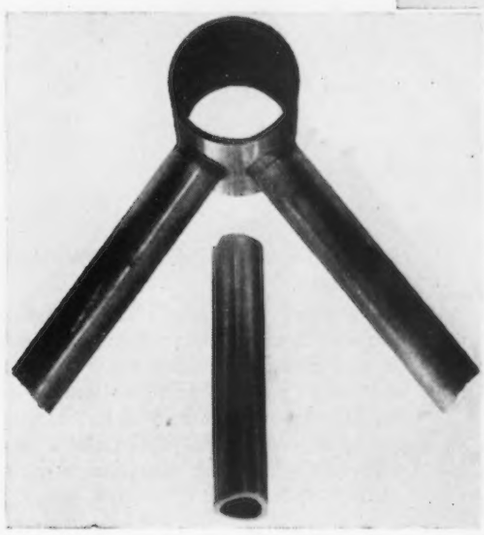
FIG. 5—Motor driven head press welder for bicycle head joints.



BELOW

FIG. 7—Clean welded Hart joints at crank hanger, also milled tube end ready for welding.





o o o

AT LEFT

FIG. 8—Destructive tensile test of Hart welded joint.

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AT RIGHT

FIG. 9—Cross-section of Hart joint showing complete fusion of the parts.

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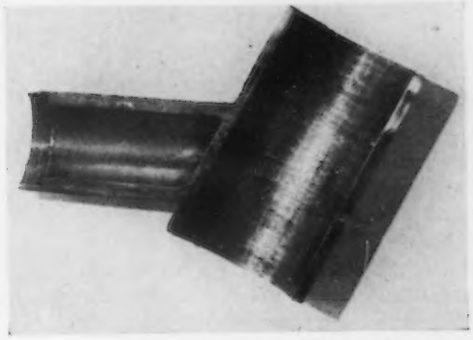


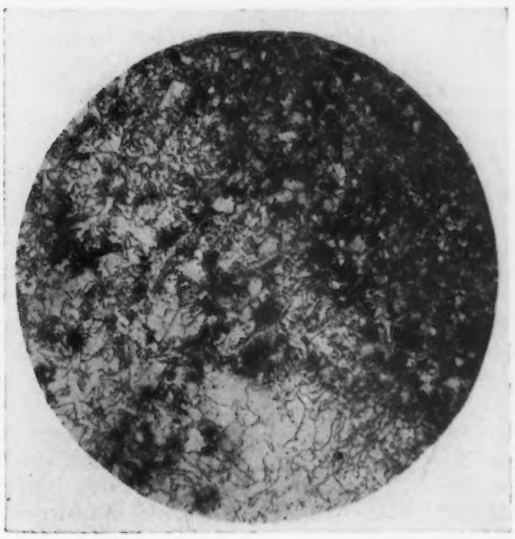
mounted on the right hand side of the welder, where it is readily accessible for changes in current.

The result of this welding process is said to be an absolutely clean joint that requires no finishing. Fig. 7 shows two such joints as they came from the welder, and a tube machined ready for welding.

Exhaustive tests in bending, in tension and under vibration have, it is claimed, shown the Hart joint to be stronger than the tube. Fig. 8 shows such a joint tested to destruction under tension. For over a year, repeated destructive, vibration and actual road tests have been made on complete bicycle frames in order to subject the joints to every possible type of stress and the joints have consistently demonstrated ample strength.

Fig. 9 is a section of a head joint showing the complete fusion of the outer tube, the reinforcement, and the cross tube. Change in grain structure is held to a minimum, due to the rapidity with which this process takes place, as may readily be seen by comparison of the photomicrographs in Fig. 10. The one at the left is of the structure of the joint shown in Fig. 9, and shows the complete fusion of the three parts, with very limited change in grain structure. The one at the right is a photomicrograph, at the same magnification, of a gas welded joint showing an overheated structure.

The Hart process is a true machine process in every stage. As can be readily appreciated from the photographs, the reinforcing and milling operations, once they have been set up, eliminate the human equation. The same is true of the welding operation, as the vacuum tube timing control holds the time interval to a definite figure, the current is accurately controlled and the pressure is applied mechanically. Consistent results and great strength are declared to be characteristic of this process of high production machine welding.



o o o

FIG. 10—Left, Photomicrograph of joint shown in Fig. 9; right, gas welded joint, showing overheated structure of metal (100 diameters magnification).

o o o

Armament Program Will Develop

By TELL BERNA

General Manager, National Machine Tool Builders' Association

o o o

AS we survey the situation in the machine tool industry, the most striking characteristic is the tireless efforts of builders constantly to improve and refine their machines. In general, machine tools are heavier and simpler in outline. "Streamlining" is a misnomer in this connection—but the effect is similar. The result is to improve the appearance of the machines, but far more important is the gain in operating simplicity, and in safety to operator and to machine alike. The motor no longer perches on the machine as an awkward afterthought but forms part of a well-planned and consistent assembly. Nor is the control mechanism a makeshift—electrical engineer and machine tool engineer have proven an effective team.

The automatic circulation of lubricating oil has become a commonplace, and the generous use of anti-friction bearings has greatly increased the range of work these machines can do economically. These features, combined with the generous use of alloy steels, result in machines that should have an almost unlimited life in the hands of a good mechanic. With these tangible improvements has come a surprising improvement in accuracy.

But our engineering problems are not as serious as the problems that result from the violent peaks and valleys of demand that seem an inseparable characteristic of our industry. About 61 per cent of the machine tools in industry are obsolete. In one case after another we hear of new machine tools that have paid for themselves in a year or two, yet at the moment the sales of our industry are far below its normal capacity. Fortunately for us the demands of foreign customers have enabled many of our plants to keep their trained men at work, but what can we do to start the tremendous task of replacing obsolescence in this country? One of these days all our customers will decide that purchases can no longer be postponed and we will be swamped again, and bitter things will be said about long deliveries.

Paper presented before American Society of Mechanical Engineers, Providence, R. I., Feb. 1.

The Armament Program

The need for bringing our armaments into better condition in an uncertain and troubled world will soon accentuate this condition. Not only does our Government need a very large number of standard machine tools to replace obsolescence in Government arsenals and yards; the manufacture of rifles, of large caliber naval guns, of shell and of other munitions, requires many machines that are not used in industry. No one wants a war, but if an emergency should arise we can hardly expect that our shores will again be protected for 14 months by a friendly power while we muster our resources. To design, build and install a huge gun boring lathe will require at least a year. Great Britain has been straining every nerve for two years to re-arm, regardless of expense. She has waived the duty on American machine tools and imported them to the value of millions of dollars, she has bought many machines from Germany; yet today her program is not complete. In this task we lag three years behind Germany, two years behind Great Britain.

Our domestic customers do not fully realize this situation, and I fear that we will find ourselves loaded to capacity with Government purchasing just when industry resumes its own program—a program of staggering dimensions—to replace its obsolete machine tools. It seems to me that the shrewd buyer should place his order right now.

To bring home these facts we apparently need a more vigorous and determined selling technique. If our customers understood this situation as we do, our plants would all be running full time. It is the job of our salesmen to see that this situation is more clearly understood.

Reforms vs. Prosperity

Underlying and accentuating these problems is another—and even more serious one. As a nation, we are like a man with one foot in a rowboat and the other on the dock. We are engaged in an effort to recover prosperity and we are attempting widespread reforms at the same time. For many years industry has followed a fairly consistent course. We have put a large part of our earnings back into better methods and better equipment. We have striven constantly for more efficient methods of production and distribution. The result has been the highest standard of living the world has ever known. We are at once the envy and the pattern for other countries. No one thinks we have reached perfection, but it must be admitted that we were making substantial and rapid progress toward "more things for more people." And ironically enough, while European nations are eagerly adopting our industrial methods and buying our machines, we are actually being advised to abandon the principles of free government under which we have made this progress in order to adopt the communism that Russia has been forced to discard, or the socialism that has brought France to the brink of disaster.

And to the astonishment of the American machine tool builder it is seriously suggested that the very machines which have made possible our remarkable industrial growth, our high wage rates and shorter working hours and our high standard of living,

Large Machine Tool Demand

TELL BERNA

have caused "technological unemployment."

It is undoubtedly true that more effective methods have caused misadjustments that bring serious trouble to many wage earners. But any sudden growth such as ours is certain to cause misadjustments somewhere. The only planned national economy we know is Russia. The news about her horrible famines and her purges has leaked through an iron censorship to teach us that rigid government control of wages and prices, of industry and agriculture, has not yet been successful.

In large measure technology has reduced prices and widened markets, has made possible shorter hours and higher wages, has improved working conditions and enriched the daily life of millions. We need to continue this process so as to extend its benefits to more people. If we are to distribute them more widely, we must have more to distribute.

Over-Simplification

Some day we will add another crime to the decalog—over-simplification, or the attempt to solve national problems with a simple formula; the hope that we can deal with a very complex situation by ignoring its complexities. It is a natural characteristic in children, who can cope with a kaleidoscopic universe in no other way. It is a serious fault if it is carried over into maturity. It leads to glib opinions based merely on the limited view within our own personal horizons. It results in such policies as raising the price of this while lowering the price of something else; farm prices must go up—electric power must go down. Wages must be increased, hours shortened, but the price to the consumer must be reduced. We must combine to set the price for coal and conserve this natural resource; we must not combine to control the flow of oil. Private capital must come into the market to bring us out of the depression with new enterprises, yet the capital market must be shackled so that it can go only one way—up. Bankers must not engage in the sale of securities but should stick to banking—bankers must set up machinery for marketing securities to people of moderate resources. Industry must employ more people, but must not use its earnings to buy plant and equipment—earnings must be paid to stockholders. Industry is dominated by a small bloc of wealthy families—industry needs to be coordinated, it is working at cross-purposes.

The somewhat complex results of a relatively simple policy are ably outlined in Shelby Cullom Davis' article in "Events" for February, entitled "Depression Diagnosis." Mr. Davis points out that Government labor policies, intended to promote industrial peace and to increase purchasing power by increasing wage rates, actually resulted in an unprecedented number of strikes in 1937, and in a 20 per cent increase in payrolls from January, 1936, to January, 1937, with only a 12 per cent increase in employment. Faced with the danger of interrupted production and higher costs, industry built up its inventory, a natural and inevitable reaction.

Effects of Profits Tax

At the same time the corporate funds which should have been available for replacement of obsolete plant and equipment were earmarked for dividends or for taxes because of the undistributed profits tax, another law intended to increase buying power. It was difficult for established concerns to secure funds for this purpose in the security market, practically impossible for new enterprises to do so, owing to a lack of confidence on the part of the public in industry's ability to show satisfactory returns on invested capital. We started out with a perfectly definite, simple idea: prosperity depends on the wide distribution of purchasing power. The remedies seemed equally simple: increase purchasing power by raising wages. Dissipate large accumulations of idle funds in corporate treasuries. But the results have been unexpected and disastrous. There were other contributing factors, of course, but this brief analysis will indicate how unexpected complications may result from a simple policy when applied to a vast and complex industrial structure.

I hope that we are approaching maturity—that the bitter schooling of the past five years will soon have a sobering effect on our judgment, and that we will agree to forego the pleasures of reform until we have recovered at least a moderate degree of prosperity.

It is our task as engineers to find better ways to serve industry; it is our task as citizens who have some knowledge of these things to fight for the principles we know to be right and to bring an end to reckless experimentation on a national scale.

New Hot Metal Transfer Car Features Flexibility and Simplicity

EVEN the lowly hot metal transfer car has undergone some beautification and simplification, with just a little touch of streamlining. A new type of self-dumping unit, designed by John D. Pugh, Koppers engineer and originator of the mixer type ladle, has a greater taper below its axis than above, instead of being symmetrical about its axis of rotation, as ladles of this type were formerly. This design results in reduced length for a given capacity and pouring spout height.

The ladle is all welded, having cast steel heads and pouring spout and a rolled steel shell. Welds between steel castings and rolled steel plates are stress relieved. This welded construction reduces weight and eliminates any hazard from loose rivets under repeated shock and strain.

Instead of elongated double-bearing trunnions formerly employed for supporting and rotating self-dumping mixer type ladles, the new ladle has trunnions which are relatively short and spherical in form at their extremities. These trunnions are supported in pedestals having concave spherical surfaces which, in cooperation with the spherical trunnions, form ball joint supports. No effort is made to keep the pedestal supports axially in alinement with the ladle itself. This eliminates any intermediate swiveled platform and permits mounting of the pedestals directly upon the car trucks. This reduces weight, and permits the trucks to assume any angular position required by track curvature or grade, by superelevation of rail on curves or low rail joints.

An electrical mechanism for rotating the ladle for unloading is mounted directly on the truck at one end of the car and is a new design. A hand wheel on the bearing pedestal may be quickly attached to the extended end of the motor shaft to rotate the ladle by hand in case of electric power failure.

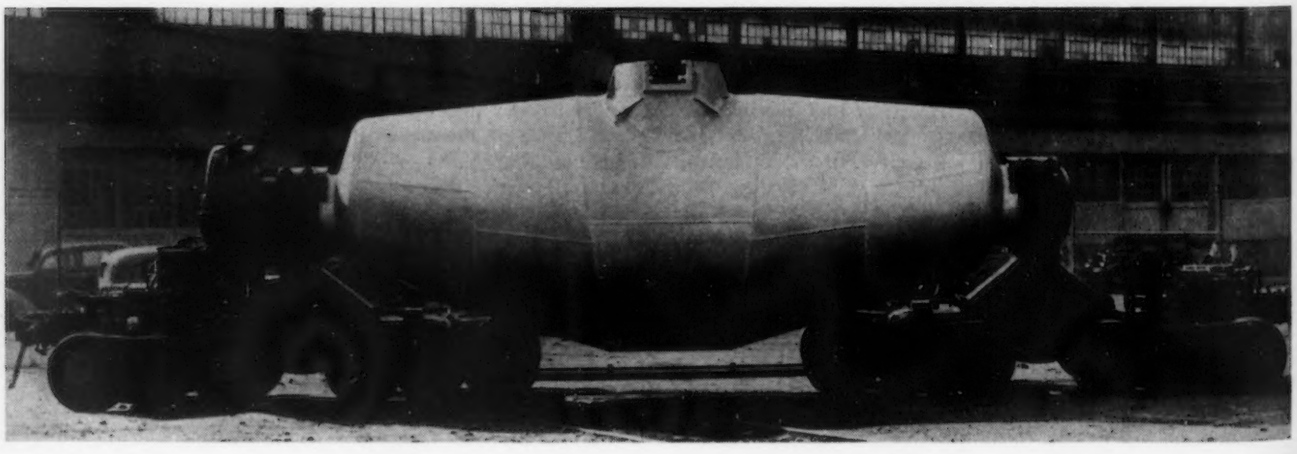
These cars are mounted on four, six or eight-wheel trucks, depending upon the size of the car and the wheel loadings permissible. The 125-ton capacity cars are mounted on two eight-wheel trucks and, when carrying a charge of molten metal 20 per cent in excess of rated capacity, due to wear in the refractory lining, they weigh, together with the charge, approximately 529,000 lb. The car length, center to center of couplers, is 48 ft. 10¾ in., and the pouring spout is 12 ft. ⅞ in. above the rails.

Powder Metallurgy Subject of New Book

POWDER metallurgy is not a new subject, but during the past several years it has shown remarkable advances. At the same time, however, there has been little correlated information published which would cover all the principles involved in such a manner as to be interesting to both those specifically interested in the subject and those metallurgists with general interests. Thus a particularly timely work is the new book, "Principles of Powder Metallurgy," by W. D. Jones, published by Longmans-Green & Co., England, and sold through the New York office at 114 Fifth Avenue. The actual manufacture of metal powders is not dealt with in great detail, as attention is fully concentrated on the use of metal powders for forming solid articles by means of pressure and heat. Specific details considered are the principles of sintering, physical properties of sintered metal compacts and the influence of the method of preparation, industrial applications, sintered hard metal alloys, and, finally, the manufacture, properties and testing of metal powders.

$8,000,000 Armor Plate Contracts Awarded

THE Navy Department has announced that awards for armor plate for the battleships *North Carolina* and *Washington* have been made to three manufacturers and involve about eight million dollars, 50 per cent of the tonnage going to Bethlehem Steel Co., 30 per cent to the Midvale Co., and 20 per cent to the Carnegie-Illinois Steel Corp. The two ships will call for 13,696 tons of class A armor. The Navy Department will open bids, Feb. 21, for 854 tons of steel shapes for various navy yards.



Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources.

	January 1938	December 1937	November 1937	December 1936	Twelve Months 1936	Twelve Months 1937
Steel Ingots: (gross tons)						
Monthly output[a]	1,732,266	1,472,241	2,153,781	4,424,367	46,807,780	49,507,766
Average weekly output[a]	391,031	333,086	502,047	1,000,988	895,329	949,516
Per cent of capacity[a]	29.14	25.36	38.22	76.42	68.36	72.39
Pig Iron: (gross tons)						
Monthly output[b]	1,429,085	1,490,324	2,006,724	3,115,037	30,618,797	36,611,317
Raw Materials:						
Coke output[e] (net tons)		2,996,525	3,395,956	4,599,700	46,275,200	52,362,098
Lake ore consumed[d] (gross tons)		1,916,588	2,734,504	4,551,379	44,639,318	53,996,076
Castings: (net tons)						
Malleable, production[e]		27,784	32,457	61,674	571,696	602,278
Malleable, orders[e]		19,753	28,170	67,035	576,334	549,972
Steel, production[e]		.....	47,100	83,615	805,691	.....
Steel, orders[e]		.....	31,397	159,430	909,080	.....
Finished Steel: (net tons)						
Trackwork shipments[a]		3,804	4,289	5,579	68,813	92,121
Fabricated shape orders[f]		99,070	132,835	166,542	1,609,016	1,628,641
Fabricated shape shipments[f]		108,396	130,156	121,775	1,548,205	1,660,570
Fabricated plate orders[e]		27,463	27,507	51,017	484,036	428,884
U. S. Steel Corp. shipments[g]		489,070	587,241	1,067,365	10,784,273	12,825,467
Ohio River steel shipments[h]		67,875	70,600	111,450	1,169,321	1,305,870
Fabricated Products:						
Automobile production[i]		346,886	376,637	519,132	4,616,857	5,016,565
Construction contracts[j]		$209,451‡	$198,465‡	$199,696‡	$2,675,296‡	$2,913,060‡
Steel barrels shipped[e]		.....	752,830	895,481	8,600,493	.....
Steel furniture shipments[e]		$2,125‡	$2,024‡	$2,113‡	$19,246‡	$26,973‡
Steel boiler orders[e] (sq. ft.)		546,615	609,577	1,872,139	11,511,557	9,923,457
Locomotives ordered[k]	9	77	13	112	533	368
Freight cars ordered[k]	25	3,287	1,625	19,035	68,341	52,788
Machine tool index[l]		142.7	127.7	257.7	201.7†	140.8†
Foundry equipment index[m]		111.2	128.0	283.3	219.3†	142.4†
Non-Ferrous Metals: (net tons)						
Lead shipments[n]		34,020	33,853	51,646	513,361	575,933
Lead stocks[n]		129,131	113,573	171,856	.....	.....
Zinc shipments[o]	24,931	29,545	32,676	59,512	561,969	570,111
Zinc stocks[o]	88,532	64,776	42,534	44,955	.....	.....
Tin deliveries[p] (gross tons)	5,550	5,020	5,195	6,930	74,005	83,665
Refined copper deliveries[q]		22,231	37,025	89,076	819,007	865,336
Refined copper stocks[q]		259,908	221,676	161,068	.....	.....
Exports: (gross tons)						
Total iron and steel[r]		626,418	556,591	244,173	3,157,341	7,567,884
All rolled steel[r]		259,113	263,418	126,173	1,167,244	2,597,083
Finished steel[r]		191,442	218,777	117,979	1,040,815	2,125,157
Scrap[r]		319,016	254,072	103,298	1,877,136	4,039,143
Imports: (gross tons)						
Total iron and steel[r]		25,792	26,996	52,584	666,728	533,160
Pig iron[r]		9,128	6,661	10,423	165,909	111,697
All rolled steel[r]		14,475	15,592	19,968	270,594	284,571
British Production: (gross tons)						
Pig iron[s]		783,800	762,300	671,400	7,681,600	8,495,200
Steel Ingots[s]		1,103,800	1,178,300	1,019,200	11,699,000	12,964,000

†Three months' average. ‡000 omitted.

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] United States Engineer, Pittsburgh; [i] Preliminary figures from Automobile Manufacturers Association—Final figures from Bureau of the Census, U. S. and Canada; [j] F. W. Dodge Corp.—37 Eastern states; [k] *Railway Age;* [l] National Machine Tool Builders Association; [m] Foundry Equipment Manufacturers Association; [n] American Bureau of Metal Statistics; [o] American Zinc Institute, Inc.; [p] New York Commodities Exchange; [q] Copper Institute; [r] Department of Commerce; [s] British Iron and Steel Federation.

. . . . THIS WEEK ON THE

. . . Automobile sales show pick-up and used car movement improves.

o o o

. . . General Motors and Ford launch tool and die programs for 1939.

o o o

. . . Long-term buying increases with hand-to-mouth purchasing tapering.

o o o

. . . Packard cuts price of six-cylinder car $100 on all body types.

DETROIT, Feb. 8.—Automotive prospects for the current year and for 1939 brightened considerably in the last week. Reports on car sales showed decided improvement. Buying for the next six months' production increased noticeably and die programs became realities. Machine tool activity struck a faster tempo, indicating that the forthcoming year will be one of the most active in Detroit's history of mass production.

Among the first indications that the used car jam has been broken is the report from Chevrolet for the second 10 days of January. According to William Holler, sales manager, used car sales during this period are up 39.8 per cent. New car sales improved 19.2 per cent. This acceleration is even more marked than that indicated a week ago by Buick figures which showed a 17 per cent increase in new car deliveries and a 36.2 per cent increase in used car sales. Concerted efforts are being made to get further speed into the disposal of stocks on hand and probably in the next month nation-wide used car "Mardi Gras" celebrations will be resorted to by some dealer organizations, a factory executive indicates.

In characteristic fashion, with sleeves rolled up and purse strings loosened, automobile manufacturers have launched the long-awaited tool and die programs for 1939 models. Their action came almost simultaneously with the decision that the next automobile show will open Nov. 11 in New York, the same date on which the highly successful 1936 show opened its doors in Grand Central Palace. So far the 1939 car programs have not left the parent shops, so the independent tool and die manufacturer has only inquiries and hopes to work with.

Tool Makers Recalled

But since the first of last week 1500 tool makers have been back at their jobs in the Ford Rouge plant and this Monday morning Fisher Body calls back on the job every available man for its tool and die work. It has already been reported that the Fisher program will be so large this year that no attempt will be made to handle all of it in the company's own shops. From Ford, inquiries have come for approximately 300 presses of various sizes to fill the new stamping plant when it is completed. Purchasing offices at the Rouge have been greatly expanded through the addition of desks in spaces formerly vacant. Pontiac is expected to buy equipment during the spring to manufacture a new engine next year and at least one other new motor design is anticipated in the General Motors group. Only at Chrysler does activity remain at a low point.

A definite buying trend such as that indicated increasingly in the last month in the automotive area may be interpreted as meaning that business has finally passed its most critical point and is past the stage where the pressure to buy commodities and materials is delicately balanced against the impulse to stay out of the market. A further return toward normal buying habits has been evidenced within the last month, according to a business survey of the Purchasing Agents' Association of Detroit.

Long-Term Buying Gains

A month ago 2 per cent of the association's membership confessed to enough optimism to buy six months ahead of production. During January this group increased to 5 per cent. Hand-to-mouth buying has decreased from 55 per cent to 44 per cent. While the 30-day buying group is unchanged at 27 per cent of the total, 13 per cent of the buyers in the Detroit territory are now operating on a 60-day basis, compared with only 8 per cent so liberal a month ago. The 90-day group has increased from 8 per cent to 9 per cent. The trends shown by the accompanying chart appear now to justify the optimistic interpretation put on the same chart when it was published on Jan. 20.

One of the best indications of the spirit of business today can be found by totaling the percentages given above. When business is very bad, all of those reached by the survey send in detailed reports, probably because they are anxious to compare notes with others. From August to January the totals have been 100, but for this latest report, 2 per cent failed to evidence enough interest to fill in their opinions. Examination of the chart will show that the percentage not reporting (the white area at the top), is large when business is at a satisfactory level.

Another phase of the purchasing group's investigation shows no absence of credit. Seventy-one per cent of the firms contacted reported credit ample and only 13 per cent said it was slow.

In line with expectations, automobile production decreased again this week, reaching an estimated 51,443 passenger cars and trucks for the United States and Canada against 59,365 last week and 72,010 for the corresponding week of last year, according to Ward's Automotive Reports. The service noted that Canadian production continues at a steady rate. An increase in domestic production is looked for next week when Chrysler

ASSEMBLY LINE . . . .

By W. F. SHERMAN
Detroit Editor

operations may be extended, but no major upswing is anticipated before late in the month. Ford production showed a decrease from 22,765 units a week ago to 20,000. General Motors output was almost steady at 21,230, compared to 21,476 the previous week. The Chrysler total was only 2950 compared with 5950 the previous week and 11,800 the week before that.

1937 Second Best Car Year

Final figures from the R. L. Polk & Co. report disclose that 1937 was the second best passenger car sales year in automotive history, while truck and commercial car sales hit their highest point on record, despite a downward drift in the last five months of the year. The combined total last year reached 4,102,001. This figure is complete for 1937 except that the last six months are estimated for the State of Wisconsin, which prohibits publication of registration figures. Passenger car sales of 3,483,752 in 1937 represent a gain of 2.3 per cent over the previous year. The best sales year for passenger cars was 1929, when 3,880,206 sales were recorded. Truck and commercial car sales in 1937 were 1 per cent over the 1936 peak and totaled 618,249.

Packard's surprise announcement of a $100 price reduction on all body types of the Packard Six was made Friday at the national meeting of Packard distributers being held at the factory. It is an attempt to stimulate buying, and may bring similar announcement from competitors, but the prospect of general price reductions is problematical. There is certainly no very strong opinion in favor of any decreases.

The opinion commonly held is that General Motors and Ford are certainly not likely to be the first to follow Packard's lead. The Buicks and Lincoln Zephyrs, which are competitive with Packard's line, have been doing remarkably well in sales, much better than any factory man anticipated in the face of current conditions.

Tar Barrel Case Ended

The tar barrel incident which resulted in the firing of six men from the Fisher Body plant at Pontiac last June was closed Friday by the ruling of Willard E. Hotchkiss, arbiter, that the firing was justified in the cases of three and that the other three should be rehired. The case is significant because it is the first automotive labor arbitration case on record. Hotchkiss was called into the case following a shut-down of the plant which followed the dipping of a non-union member into a barrel of flintkote in the plant and which was followed by the discharge of six men who were held responsible by the company. The decision stressed the fact that Benjamin B. Boyd, a UAW shop committeeman in the plant, was "under heavy responsibility to prevent an occurrence like the one that took place" and added that he had "by active omission violated the agreement by the parties."

UAW activity was renewed in Detroit after weeks of comparative silence by a mass meeting of 50,000 to 75,000 people in downtown Cadillac Square Friday afternoon. CIO leaders said that resolutions adopted by acclamation of the throng called for the following:

1. Moratorium on debts owed by the unemployed.
2. Fifty per cent reduction in rent with a threat of rent strikes if the demand is not met.
3. One hundred per cent increase in welfare allotments.
4. A vigorous fight for a labor government in the City Hall and the state of Michigan.
5. A voice in city government.

The crowd was orderly and broke up peacefully under the guidance of 2500 police.

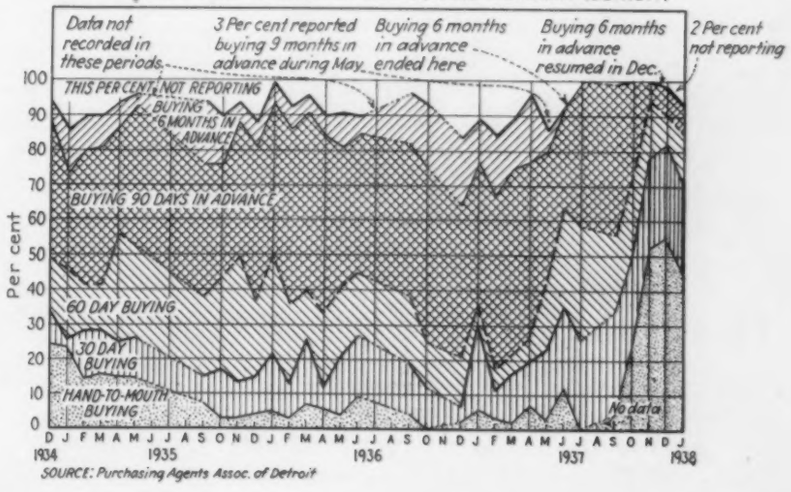
Further details of the Norge expansion program indicate that its $2,000,000 expenditure will be about equally divided for new construction and for equipment and modernization of present buildings. On the west side of the state, at Muskegon Heights, a new plant will be erected containing approximately 150,000 sq. ft. of floor area. It will be a two-story structure of concrete and reinforced steel construction. When completed, it will give Norge more than 870,000 sq. ft. on a 28-acre plant site. The new unit will adjoin the stove plant erected last year when the company moved the Detroit Vapor Stove division to Muskegon. It will increase production capacity about 20 per cent and will permit Norge output in its household and commercial line to exceed 4000 units daily.

Propeller Plant Opens

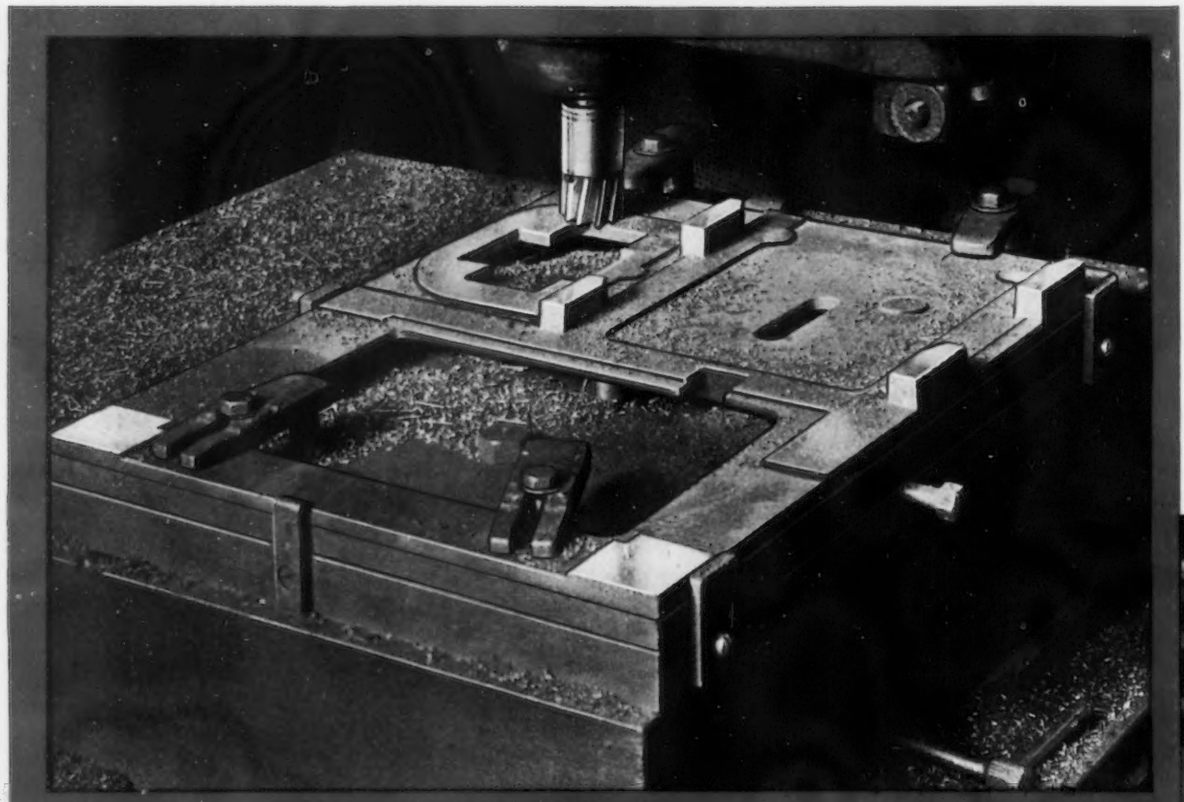
A new airplane propeller factory operated by the Supreme Propeller Co. has started production at a plant northeast of the city on Gratiot Avenue near Hartung Airport. The company recently moved from Wichita, Kan.

Continental Motors Corp. at Mus-

BUYING TRENDS IN METAL-WORKING FIRMS AND AUTO INDUSTRY (DETROIT)

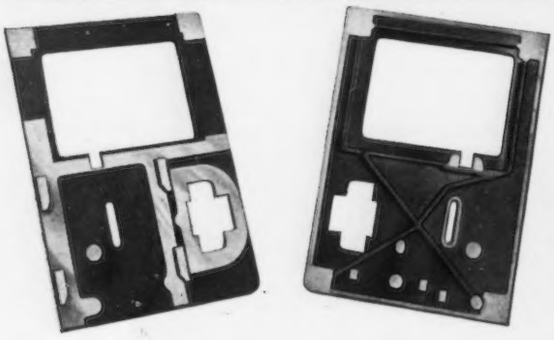


SOURCE: Purchasing Agents Assoc. of Detroit



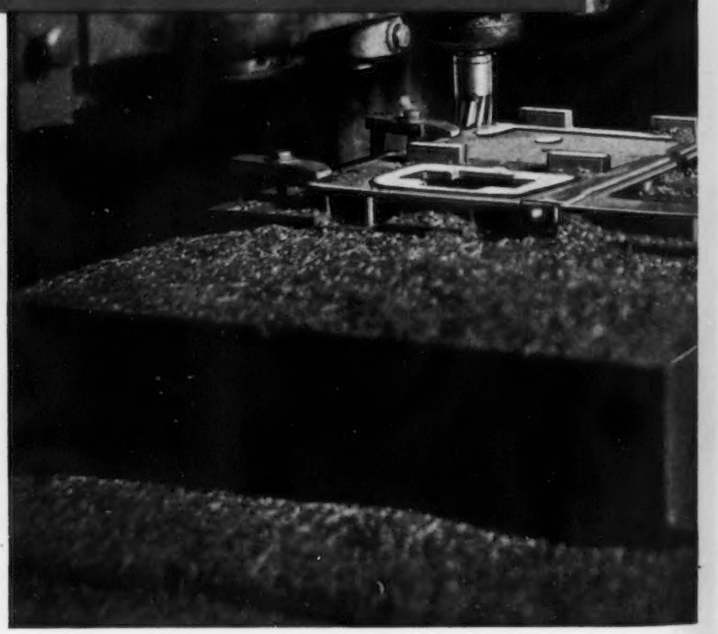
The operator on the opposite page, watching his cutter slice smoothly along, sees exactly what *you* do in the picture above. He is milling all the surfaces and bosses on this cast-iron piece. He takes a roughing cut about 1/16″ deep all over, with a .005″ feeler gage in place. This first cut gets under the scale into good iron, and leaves .005″ of stock for finishing. Then, without changing anything except removing the feeler gage, he takes the finish cut. The completed plate must be held accurate within .002″. Even with that accuracy he completes the top of the plate in 14.8 minutes, and the bottom in 14.6 minutes. *These are average times per piece over an entire normal day's production.* If he wants to speed up and "stay with it" he can better this output by 25% or more.

Notice the inexpensive fixture and easy setup. Jobs like this would cost much more without the convenience and flexibility of the Pratt & Whitney Vertical Miller and Profiler. That is why men who know milling specify this machine for work similar to the piece above, whether the run is small or large.



This is the job . . . . . .

Above are shown the top and bottom of the cast-iron plate with its various pads at different levels which are finished by the P&W Vertical Miller and Profiler. The outside dimensions of this plate are approximately 15⅝″ *by* 11¼″.



"Fast, accurate, convenient"

says this large manufacturer

(name on request)

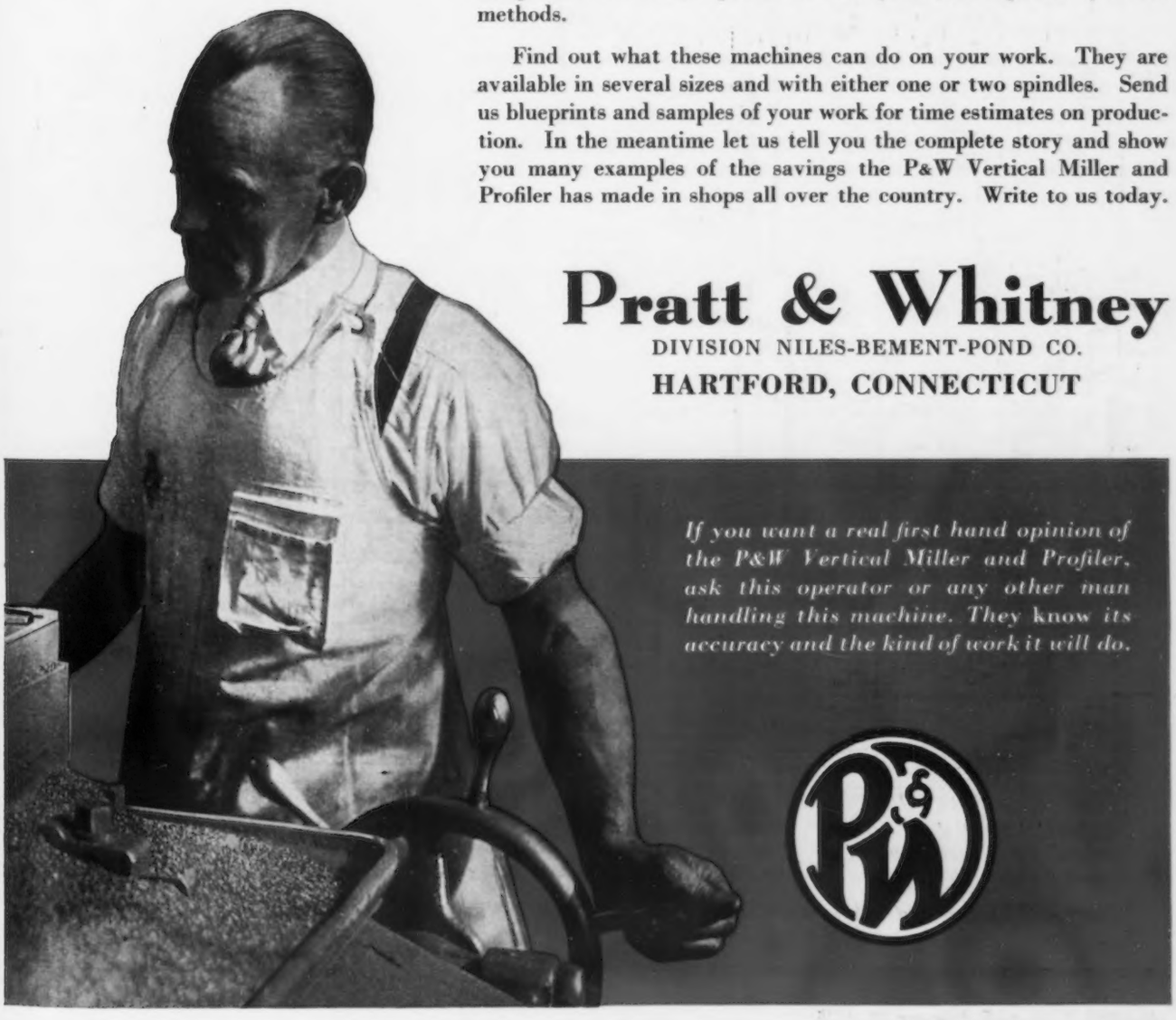
Pratt & Whitney Vertical Millers and Profilers

It has all the advantages of a strong, rigidly built vertical miller capable of heavy cuts, combined with the flexibility and wide work range of a profiler. This machine is particularly useful in spot milling or finishing surfaces in various planes which would be inaccessible to an ordinary miller.

The characteristics of this machine are such that it is easy and simple to set up for a production run. For this reason it is ideal for the shop having many different small lot milling jobs. This ease of changing over from one job to another makes the machine economical to operate.

The P&W Vertical Miller and Profiler frequently eliminates the cost of elaborate tooling. Such fixtures as are needed on this machine are usually quite simple, and often none are needed at all. We have seen jobs finished on this machine in less time than it would take to design and build the special fixtures and tools required by other methods.

Find out what these machines can do on your work. They are available in several sizes and with either one or two spindles. Send us blueprints and samples of your work for time estimates on production. In the meantime let us tell you the complete story and show you many examples of the savings the P&W Vertical Miller and Profiler has made in shops all over the country. Write to us today.

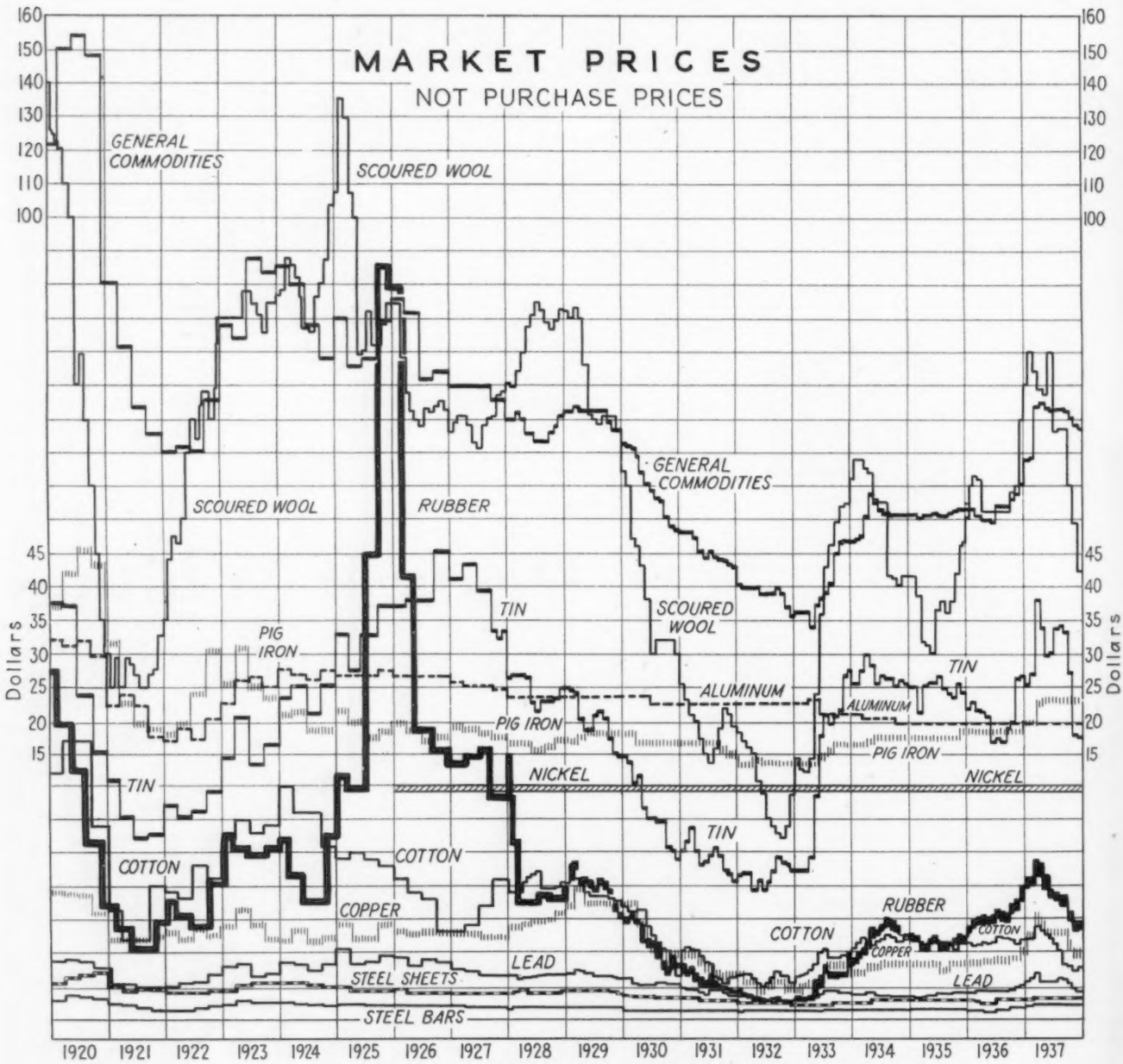

If you want a real first hand opinion of the P&W Vertical Miller and Profiler, ask this operator or any other man handling this machine. They know its accuracy and the kind of work it will do.

Pratt & Whitney
DIVISION NILES-BEMENT-POND CO.
HARTFORD, CONNECTICUT

kegon has announced that it will gradually recall 600 workers to add to its present force of 900. Receipt of new business is the reason given by W. R. Angell, president. He disclosed that the company will start the manufacture of motors for three new customers in the agricultural implement business.

Elsewhere in the state, new plants of the Motor Wheel Corp., Lansing, and the Hastings Mfg. Co., Hastings, Mich., makers of piston rings and expanders, are reporting increased activity. The new plants of Motor Wheel, the Centrifuse Brake shop and hub shop have been put into operation and currently are on a limited schedule. The Hastings company is operating at full force, having reported 1937 business 84.9 per cent greater than 1936.

PRICE TREND FROM 1920 TO 1937, INCLUSIVE, OF PRINCIPAL COMMODITIES ENTERING INTO THE PRODUCTION OF AUTOMOBILES



Cotton M.U. Spot N.Y.
Rubber - R.R.S. Sheets - Spot N.Y.
Lead - Pig Sport - N.Y.

Aluminum 98.99% Spot N.Y.
Copper - Elec. Spot N.Y.
Tin Straights Spot N.Y.

Pig Iron Basic Valley
Steel Sheets Auto Body Pittsburgh
Steel Bars Soft Carbon Pittsburgh

Cents per lb. Cotton - Lead - Rubber - Nickel - Copper - Tin - Wool - Steel - Steel Bars *Dollars per cwt Aluminum* *Dollars per ton Pig Iron*

Capital Goods Activity Declines Three Per Cent

THE IRON AGE Weekly Index of Capital Goods Activity

(1925-27 = 100)

	Week Ended Feb. 5	Week Ended Jan. 29	Comparable Week 1937	Comparable Week 1929
Steel ingot production	42.3	45.4	109.1	116.6
Automobile production	54.6	63.2	76.3	137.4
Construction contracts	71.5	64.8*	76.8	130.6
Forest products carloadings	48.7	55.4	60.8	113.9
Production and shipments, Pittsburgh District	56.0	53.2*	103.3	118.8
Combined index	54.6	56.4*	85.3	123.5

* Revised.

CONTRASEASONAL declines in ingot production, automobile assemblies and carloadings of forest products in the week ended Jan. 29 caused THE IRON AGE seasonally adjusted index of capital goods activity to decline 3.2 per cent below the preceding week to 54.6 per cent of the 1925-27 average. The construction series and the Pittsburgh series recorded distinct advances over the previous week, but these gains were not sufficient to overcome the losses of the other components of the index. In order of weighted importance, the automobile index showed the heaviest loss, dropping 8.6 points to 54.6. Assemblies last week, totaling 51,443 units, were 7922 below the preceding week and 20,567 below a year ago. The construction series continues to be the brighest factor in the index. A contract for the completion of the Grand Coulee Dam amounting to $34,442,000 boosted the total of engineering awards for the week to $70,808,000. This total is 39 per cent above the week ended Jan. 29 and 71 per cent above the corresponding week a year ago. Activity in the Pittsburgh area continued to improve and the index number advanced 2.8 points to 56.0. The volume of shipments originating in this area was the highest in seven weeks and industrial production advanced to a level comparable with the middle of November, 1937. The weighted average index number of THE IRON AGE capital goods index for January is 55.6 against 59.2 for December, 1937, and 91.7 for January, 1937. The January index position is the lowest level reached by the monthly figure since May, 1935.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

THIS WEEK IN WASHINGTON

. . . Meeting of "Little business men" reminiscent of NRA but constructive program comes out after initial turmoil.

o o o

. . . President Roosevelt clings to plan to lift prices to 1926 level; some steel product quotations are lower than in 1926.

o o o

. . . Federal Trade Commission enters complaint against steel furniture manufacturers for alleged price fixing.

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON.—All roads led to Washington Wednesday, Feb. 2, when 1000 of the country's so-called "little business men" from 44 states took a holiday and trouped into the Commerce Department's oak-paneled auditorium at the invitation of Commerce Secretary Roper, who acted at the suggestion of the White House.

Not since the ill-fated wage and hour conference called by George L. Berry, the President's erstwhile "coordinator for industrial cooperation," has there been such a stormy session. The Berry fiasco broke up almost as soon as it started and it is a sordid chapter in the Administration's history which it would like to forget. Last week's meeting approached the breaking point, too, early in the session but regained a semblance of order after Roper, repeatedly banging his gavel for order, dispersed the delegates into 10 scheduled group conferences.

Reminiscent of NRA

In many ways it was a two-day return engagement of when the NRA nightmare was in flower. The surroundings were identical. Familiar faces frequently seen in the NRA heyday helped to recreate the picture. But it lacked the colorful Johnsonian touch which characterized the former Recovery Administrator's salty phrases and "crack-down technique" and it was recalled that under his regime business emissaries never ran rampant during a code hearing and seldom, if ever, started a stampede toward the microphone.

At the Roper conference, however, every delegate had a solution for the business recession and few displayed any reluctance to reveal their plans. Proposed cures ranged all the way from having the Government buy up the country's used cars to the naive suggestion that the President divorce himself from politics long enough to dispel the fog of business uncertainty.

Commerce Department officials were disturbed no end because of the bedlam that reigned, but Roper and his Assistant Secretary, Ernest Draper, nursed the satisfaction that at least critics could not say that "we planned it that way." It was whispered around Commerce corridors that temporary chairmen had been instructed to "lean over backward" in allowing delegates a free rein to avoid the stigma that any part of the program had been prearranged.

But irrespective of the democratic trend of conference proceedings, the rumor persisted that the Administration had its own plans to cram down the neck of business. One delegate jolted the trade practice conference into action by charging the New Deal could look at conference reports and deduce that business did not know itself what was needed and embark on its own program. After that the group conference got busy.

Despite the appearance of a gala occasion, the conference had its share of pathos. To those business men who came prepared to offer some constructive plans, but were forced to yield to the high proportion of peddlers of crackpot theories and panaceas, the meetings were just a series of headaches.

Small Business Men Also Hit

The various group meetings, however, were for the most part quiet and orderly. Delegates genuinely disturbed about meeting payrolls in the face of declining markets participated in some serious and constructive discussions, but the attention of the press was focused on the noisy group in the auditorium where hundreds with stentorian voices capitalized to the fullest on the carnival atmosphere.

But above the din and confusion of the wild sessions, these facts stood out —that the small business man suffers together with the large when hit by a depression; that when business is good, it is good for both groups; that they suffer alike from ill-advised legislation irrespective of the Administration's objectives; that the small business man, like the large, gets a bad case of jitters every time a Government theorist goes on the air; and that the fear of uncertainty affects all business regardless of size.

Indeed, it was held to be a mistake to segregate big from little business in the Government's announced attempt to formulate a recovery program. This view was advanced by Wallace D. Kimball, of the Standard-Knapp Corp., Long Island City, N. Y., manufacturer of heavy machinery and an employer of 200 workers.

A participant at the trade practice and monopoly conferences, Mr. Kimball said he favored the principle of

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Look at this 5500-pound tough alloy reamer body with its variety of angles and dimensions. Imagine this job in your milling department! Chances are you would want a CINCINNATI No. 5 Plain High Power with its wide range of travel, ability to take cuts up to twenty horsepower rated capacity, plenty of weight and simple effective controls, both front and rear, where you need them.

In spite of the large size of this reamer, the operator has a perfect close-up of his work. With work and cutters in full view from the rear, he engages the vertical and longitudinal feed at the same time, always milling the angles with the work lying parallel to the table. Write for catalog M-582 which gives you a complete story of CINCINNATI High Power Milling Machines. The Cincinnati Milling Machine Co., Cincinnati, Ohio, U. S. A.

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SYMBOL OF A DEFINITE STANDARD OF WORTH

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MILLING MACHINES *and* GRINDING MACHINES

collective bargaining but called for revision of the Wagner Act to make labor unions responsible for their activities.

"Some redress should be given to industry under the labor law," he told the conference. Throughout the sessions, reference to revising the Wagner Act—and there were many—brought hearty applause.

Mr. Kimball also urged revision of the undistributed profits tax which he said was obstructing business expansion, and advanced the suggestion that modification or repeal of the tax would offer an immediate incentive for buying. Mr. Kimball later was named chairman of unemployment group and reported the results of the conference to the President with 11 other delegates.

The principle of the undistributed profits tax was held to be sound by Joseph G. Sachs, Jr., of the American Elevator & Machine Co., Louisville, Ky., but his view was that little business should be given some preference over larger competitors.

Easier Credit Needed

Recommending that Government machinery for making loans to small industry be expanded and improved, Mr. Sachs declared that usual credit channels are blocked at least so far as the small business man is concerned. He said he had found that to be true during the last several years.

J. H. Anderson, general manager, and C. G. Cooper, Washington representative, of the Cooper Bessemer Corp., Grove City, Pa., were interested observers at both the wage-hour and trade practice meetings, but neither took part in the discussions. Mr. Anderson, who said his company employs about 2600 men and is operating at 50 per cent of capacity turning out engines and compressors, expressed himself as not favorably impressed with the sessions. He declined to forecast what the outcome might be, adding that "you can never tell."

Other conference groups were designated to discuss unemployment, social security, housing, location of small industries, loans to small companies, and Government research for small business. The latter had the poorest attendance. Loans to small business drew the largest crowd except for the miscellaneous study group where a wide range of subjects were milled over.

On Friday a committee of 12 conferred with President Roosevelt for over an hour and reminded the Chief Executive that small businesses "still do more than half of the total volume of business." They forecast that business will flourish when "relationships between Government and business are more clearly charted."

Emerging from the White House with other conferees, Harold D. North, president of the Ferry Cap & Set Screw Co., Cleveland, declared:

"We had a fine visit with the President."

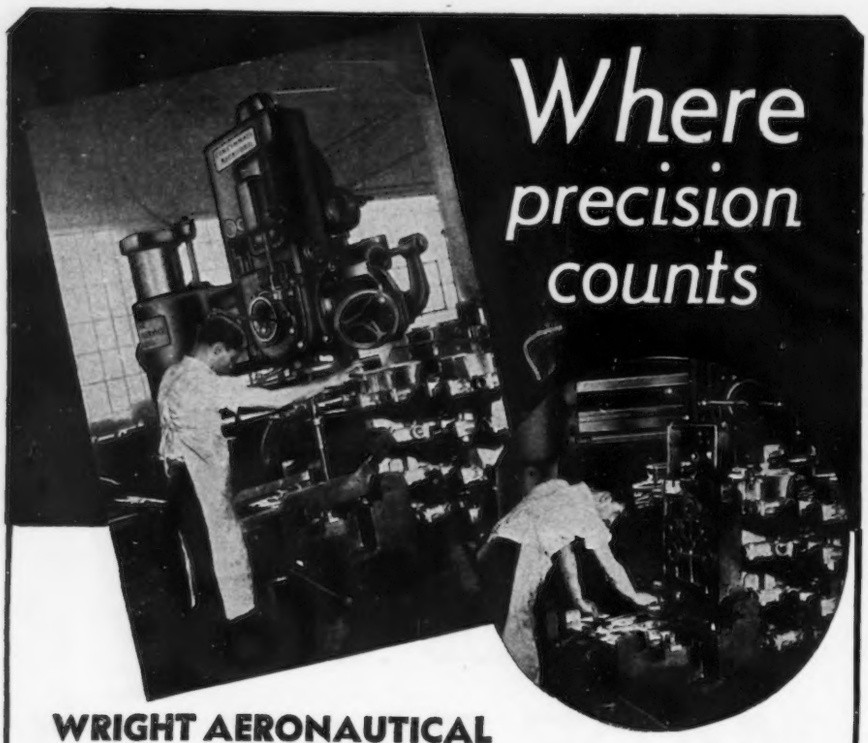
He declined to comment further as did most of the others.

Many Recommendations Made

Among the recommendations which the committee laid before the President were the following:

Loans to Business—Establishment of a Government agency for making loans wherever existing financial institutions are unable to function.

Labor—Employer and employee be held equally responsible for observing collective bargaining contracts; imme-



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Centralized control in the head—rapid power traverse—long spindle sleeve bearing at the bottom of the head—herringbone gears for the slow speed spindle drive—provide an ability to take heavy cuts without chatter and are just a few of the reasons why Super-Service Radials produce accurately and at low cost.

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diate investigation of the Wagner Labor Relations Board; frowned on a wage and hour bill and questioned the merits because of geographical differentials.

Taxes—Broadening of the income tax base and simplification of all taxation forms including social security taxes; reduction of unemployment taxes in stabilized industries; modification of the capital gains tax; repeal of the undivided profits tax.

Unemployment Relief—Administration be returned to local communities; curtailment of Government expenditures in the interest of a balanced budget.

Monopoly—Strengthening and enforcement of laws curbing monopolistic practices; retention of Robinson-Patman and Miller-Tydings laws and the State fair trade practice acts.

Housing—Confinement of Government's direct home building activities to slum clearance projects; machinery for making loans to home owners at interest as low as 3½ per cent; diversion of WPA labor and money from building construction.

Social Reform—Urged that it be made less rapid so as to not disrupt industry.

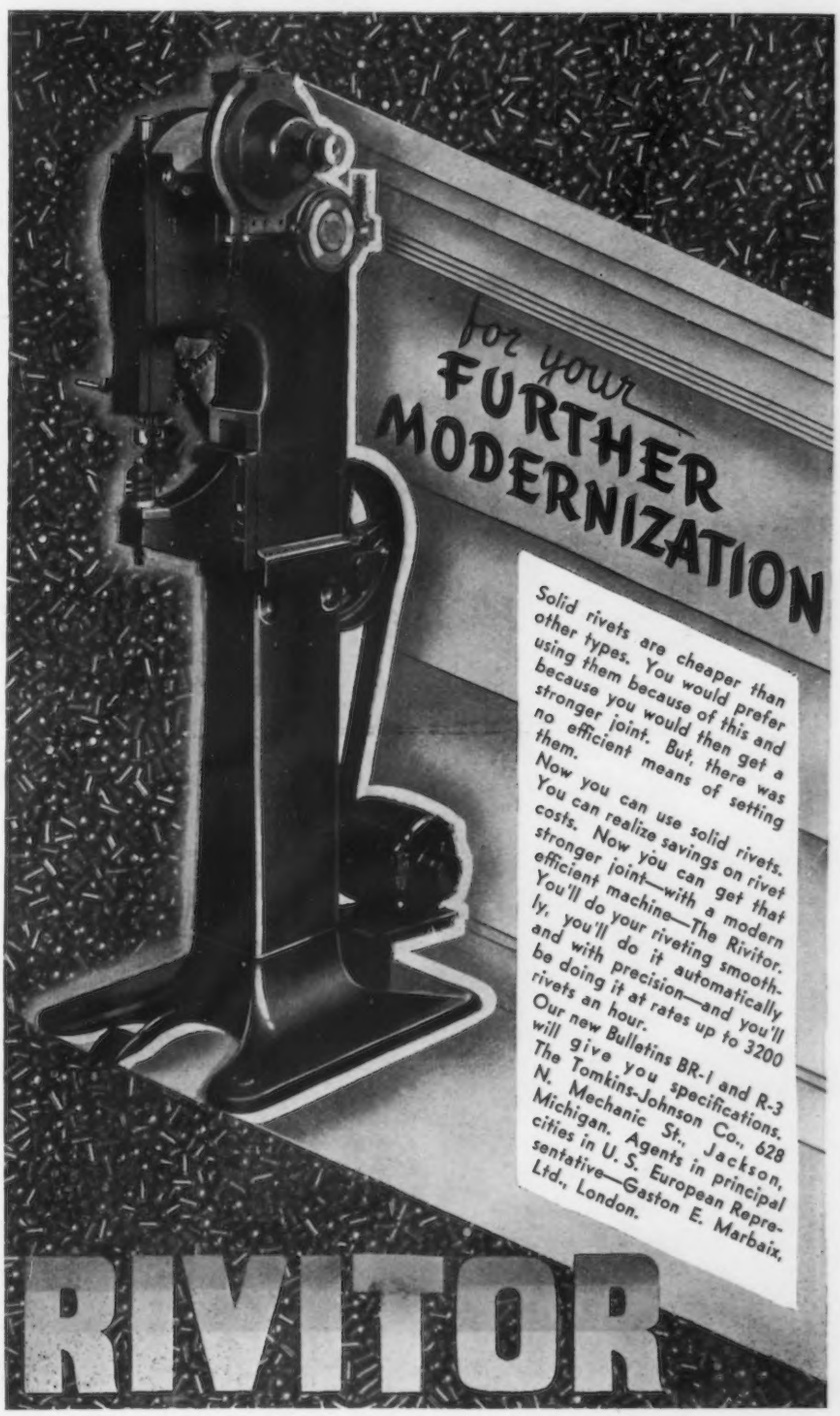
Permanent Small Business Council—To represent smaller business enterprises and with equal regional representation.

Just what the White House and the Administration plans to do about the list of 23 recommendations could not be foretold. Opinions varied. But Secretary of Commerce Roper was optimistic. He hailed the conference as opening up a new era of round table conferences between the Government and business. Others just wondered.

WASHINGTON. — President Roosevelt recently repeated that he is holding firmly to his long-term objective of restoring 1926 price levels. When the President says he wants 1926 price levels restored, he must not mean all such levels. For example, restoration of steel prices in that year would mean boosts in some very important products. That would run directly counter to Administration attacks on durable goods prices, of which steel has been made a particular object, though, as indicated, it is suspected, regardless of Administration statements to the contrary, that it is not so insistent now as formerly on steel price cuts. It had been told by the CIO that they must not be slashed, John L. Lewis and Philip Murray taking the position that such cuts would inevitably mean wage reductions. Moreover, Administration officials have submitted studies which justify prevailing steel prices.

Automobile Steels Down From 1926

But what would happen if 1926 steel prices were restored? For one thing the steel industry's largest consumer would be faced with sharply increased costs of one of its largest items of purchases—automobile body sheets. The 1926 average price for No. 20 cold rolled sheets was 4.30c., Pittsburgh, while today the price is 3.55c. —$86 and $71 per net ton respectively. This means if the automobile industry and the many other industries using this product were required to pay the 1926 price they would be confronted with an increase of $15 per ton. They would have to ante $8 per ton additional for cold rolled strip steel, also used in large quantities by the automotive industry. The 1926 average price was 3.60c., Pittsburgh, compared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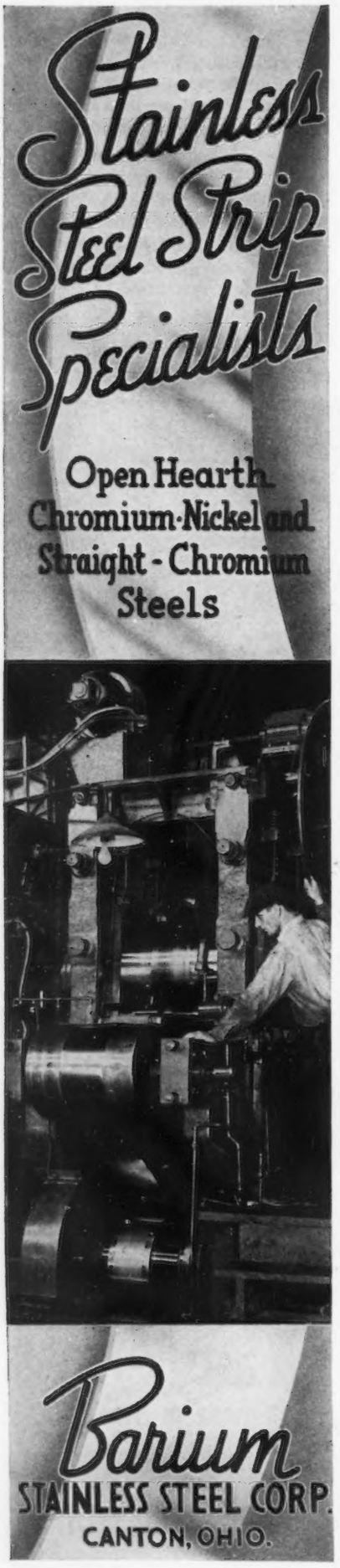
Solid rivets are cheaper than other types. You would prefer using them because of this and because you would then get a stronger joint. But, there was no efficient means of setting them.
Now you can use solid rivets. You can realize savings on rivet costs. Now you can get that stronger joint—with a modern efficient machine—The Rivitor. You'll do your riveting smoothly, you'll do it automatically and with precision—and you'll be doing it at rates up to 3200 rivets an hour.
Our new Bulletins BR-1 and R-3 will give you specifications. The Tomkins-Johnson Co., 628 N. Mechanic St., Jackson, Michigan. Agents in principal cities in U. S. European Representative—Gaston E. Marbaix, Ltd., London.
RIVITOR



with the present price of 3.20c. Can makers and numerous other important consumers of tin plate would find the price of this product upped $3 per ton, the 1926 average having been $5.50 per base box while it is now $5.35. Even the financially pressed railroads would have to pay 50c. per ton more for their rails, since the 1926 level was $43 while it is now $42.50 per gross ton.

But this is the side of the steel story that either consciously or unconsciously is concealed. It probably is studiously disregarded by those who, for political or other purposes, see that in attacking the price structure they must make an ex parte argument, and at that an unsound argument. The same practice is followed by the same group in attacking the "Pittsburgh-base" system, though in reality there no longer is such a system. Because of competition and expansion of demand in the market it has become a multiple system with an ever-increasing number of basing points. Yet those attacking the Pittsburgh-plus system—to misuse a generic term—always speak of the plus. They never speak of Pittsburgh-minus which is just as common if not more common in a light market than Pittsburgh-plus, Chicago-plus, and dozens of other plusses.

Technological Improvements Lower Prices

What has brought about the reductions in steel prices of today as compared with those of 1926, notably in such lines as sheets and strips? For one thing they have been reduced, even in the face of mounting taxes and wages and shorter hours, by technological developments. Modern mills that are marvelous for their efficiency, fast and accurate, have been designed and engineered to meet demands of modern industry which have enormously increased the market for such products. Mass demand means mass production and the latter means reduced costs, the only means by which they can be reduced. They cannot be reduced by legislation nor by bureaucratic fiat, regardless of official ardor. And unless costs are reduced wages cannot be increased and hours shortened.

The reductions cited not only have been made but better products are being made and when the demand justifies, as it did during most of 1937, employment is increased. Employment last year attained an all-time peak.

This is its own answer to those who, professing to be progressive, rail against technological development. There are lags during periods of readjustment in methods of production which shift or reduce employment, but the lag is more than overcome once readjustment has been made and markets built up for modern production of quality products. With such development comes lower prices. This will continue to be the way of the world, no matter what obstacle Washington may seek to erect, really not knowing what it is doing. And certainly if it is insisting "firmly" on restoration of 1926 prices the Administration does not know what it is talking about.

Steel Office Furniture Manufacturers Cited by F.T.C. for "Price Fixing"

WASHINGTON.—The Federal Trade Commission has issued a complaint against the Steel Office Furniture Institute, of Cleveland, and 12 member manufacturers, charging price fixing in violation of section 5 of the Federal Trade Commission Act. The usual 20-day period was allowed for respondents to file answers.

Manufacturers named in the complaint include: Art Metal Construction Co., Inc., Jamestown, N. Y.; Bentson Mfg. Co., Aurora, Ill.; Berger Mfg. Co, Canton, Ohio; Browne-Morse Co., Muskegon, Mich.; Corry-Jamestown Mfg. Corp., Corry, Pa.; General Fireproofing Co., Youngstown; Globe-Wernicke Co., Norwood, Cincinnati; Invincible Metal Furniture Co., and Shaw-Walker Co., Manitowoc, Wis.; Metal Office Furniture Co., Grand Rapids, Mich.; Remington-Rand, Inc., Buffalo; Victor Safe & Equipment Co., Inc., North Tonawanda, N. Y.; Yawman & Erbe Mfg. Co., Rochester, N. Y.; and the Columbia Steel Equipment Co., Philadelphia.

The last named company is the only one which is not a member of the institute, but it allegedly cooperates with the other respondents in their "price-fixing program," the FTC said.

The complaint charges that since June, 1935, the respondent manufacturers agreed to maintain prices, dis-

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Yes, Sir.... Monarch Pioneers in the "Little" Things, too!

NO more scored and battle-scarred ways to worry about when you use Monarch lathes . . . no more loss of efficiency because the ways are worn . . . no more need to concern yourself with felt wipers and the grinding "lap" that is responsible for the damage.

Why? Because chemistry has wrought another miracle—because Duprene, the new synthetic rubber, is not affected by oil. It has taken the place of felt as way wipers on Monarch lathes. Duprene wipers laugh at oil and foreign substances; they never pick up any grit, dirt or abrasive . . . and, after months of service, look like new.

You'll never have to worry about your Monarch lathe bed's being scored, because throughout its long and accurate life, Monarch's Duprene wipers (on the carriage wings and tailstock base) clean the bed ways as they have never been cleaned before.

Monarch lathes are equipped with the American Standard CAM-LOCK flanged type spindle nose.

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• Indianapolis Sales Office: 3115 North Meridian Street.
• Pittsburgh Sales Office: 604 Chamber of Commerce Building

counts, uniform selling terms; required agents to maintain resale prices; filed price schedules and discounts with the institute and adopted rules to prevent deviation. It was also alleged that the institute collects and disseminates price, discounts and other information used by member manufacturers.

The commission at the same time issued a complaint against the Tidewater Office Equipment Dealers' Association, of Norfolk, Va., alleging agreement among members as to resale prices fixed by member manufacturers of the institute.

70% Of Steel Workers Born In U. S.

SEVEN out of 10 employees of the steel industry are native-born Americans, and two out of 10 are naturalized citizens, it is estimated by the American Iron and Steel Institute on the basis of reports from more than a score of representative steel companies. Only one out of 10 workers is an unnaturalized, foreign-born resident.

The proportion of American and foreign-born employees varies in different localities, the reports indicate. In steel plants located in large cities as many as 40 per cent of the employees may be foreign-born, while in steel mills in smaller communities, particularly those in agricultural areas or in the South, foreign-born employees may represent as little as 5 per cent of the total.

A larger proportion of steel workers are now citizens of the United States, either by birth or by naturalization, than ever before, personnel executives of companies in the iron and steel industry state.

In 1929 about 15 per cent of the total hired were non-citizens, and 85 per cent were American-born or naturalized citizens. By 1933 the proportion of non-citizens had declined to 11 per cent, and the proportion of citizens had risen to 89 per cent. In 1936, only about 2½ per cent of the new employees hired by the companies were non-citizens.

The proportion of non-citizens among the group of new employees added to the payrolls of the companies in the first half of 1937 was only 1.8 per cent, indicating that 98.2 per cent of the group were United States citizens.

Small House Uses 4 Tons Iron, Steel

NEARLY four tons of products made from steel, wrought iron and cast iron are used in the construction and equipment of a typical small dwelling costing approximately $4,000, according to the American Iron and Steel Institute.

Total cost at the steel mill of the iron and steel entering into those products, on the basis of current price quotations, is estimated at about $172, approximately 4 per cent of the cost of the dwelling.

Bulking largest in the total weight of items of equipment are products made of cast iron. A total of 4250 lb. of cast iron is used in the radiators, steam boilers, plumbing lines, bath tubs, wash basins, laundry tub and kitchen sink.

Approximately 3620 lb. of finished

SIMPLICITY OF OPERATION

J&L Universal Turret Lathes are designed for ease of operation, to give the operator a more productive day.

A single lever controls the forward and reverse motion of the spindle and, in its neutral position, automatically applies a brake.

A wide range of twelve spindle speeds is available by the movement of a single lever.

Nine feeds for the turret travel are ready for use by the movement of a single lever.

Nine longitudinal feeds for the carriage and nine feeds for the cross slide are also controlled by a single lever.

These features mean that selection of the right speed and feed is easily and quickly done. The result—lower cost per piece on your turning work.

A J&L Engineer will be glad to help study your particular needs.

JONES & LAMSON MACHINE

steel and iron products are also used in building a $4,000 dwelling. Metal lathing is the largest single item in the total, 1160 lb. being required in the walls and ceilings.

2429 Pounds of Other Products

It is also estimated that about 440 lb. of steel nails are used in the construction of such a house, as well as 418 lb. of galvanized gutters and downspouts and 200 lb. of flashings. Another relatively important use for steel is conduit for the electric wiring. About 175 lb. of conduit are required in the type of dwelling which was analyzed.

Other steel products include 65 lb. of light structural shapes, 60 lb. of door and window hardware, a 93-lb. hot water tank, 13 lb. of smoke pipe, and a medicine cabinet made of sheet steel, weighing about 15 lb.

About 950 lb. of wrought iron pipe and fittings are used in the heating and plumbing system.

SINGLE LEVER
SPEED SELECTOR

COMPANY, Springfield, Vermont, U. S. A.

..PERSONALS..

J. M. SIAS has been appointed assistant vice-president, raw materials department, U. S. Steel Corp. of Delaware, Pittsburgh. Mr. Sias has been connected with the U. S. Steel Corp. and subsidiaries since 1893, at which time he worked in the auditing department of Carnegie Steel Co. and later was transferred to the raw materials department. In 1909 he went to New York as assistant to vice-president, raw materials, U. S. Steel Corp. of New Jersey, and in recent years has been assistant to the vice-president in charge of operations for that corporation. Mr. Sias is a member of the American Iron and Steel Institute.

J. M. SIAS

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N. B. ORNITZ has been appointed president of the Power Piping Division of the Blaw-Knox Co., Pittsburgh. He is also a director and a vice-president of the Blaw-Knox Co. and will continue the management of the National Alloy Steel Division of the Blaw-Knox Co. W. N. QUARTZ has been appointed vice-president in charge of operations of the Power Piping Division of Blaw-Knox Co.

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THEODORE F. SMITH has been elected executive vice-president, Oliver Iron & Steel Corp., Pittsburgh. He was formerly vice-president. CHARLES FASSINGER, SR., has been made vice-

president in charge of development and research. He formerly was vice-president in charge of operations. MORGAN KAVANAGH, formerly of Cleveland, succeeds Mr. Fassinger in the capacity of general plant manager.

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CARL C. BROWN, who has been district sales manager of Republic Steel Corp. at Birmingham since the merger with Gulf States Steel Co. last year, has been named assistant manager of sales of the wire division with headquarters in Birmingham. He will direct Republic sales activity in wire and wire product markets throughout the South. J. R. FRAINE, who has been a member of the wire division sales organization since May, 1936, has been appointed assistant manager of sales of that division for the northern territory, with headquarters in Chicago. R. J. WORKING, district sales manager of Republic at Birmingham prior to the Gulf States merger, has resumed the district managership with the increased duties entailed by business acquired through the merger.

Mr. Brown joined the sales department of the Gulf States company as chief clerk in 1910, following employment in the traffic department of the Nashville, Chattanooga & St. Louis Railroad and in the traffic and sales departments of the Atlantic Steel Co. He was general sales manager of Gulf from 1918 to 1922, and returned to this post in 1925 after three years as vice-president and general sales manager of the Nichols Wire Sheet & Hardware Co., Kansas City.

Mr. Fraine gained his early experience in the steel industry with the Red Top Steel Post Co. from 1923 to 1928. He resigned in the latter year to join the Keystone Steel & Wire Co., where he remained until September, 1935. He became identified with the Chicago district office of Republic Steel in 1935.

C. C. BROWN

J. R. FRAINE

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JOHN LESTER PERRY, newly elected president, Carnegie-Illinois Steel Corp., was honored at Pittsburgh last

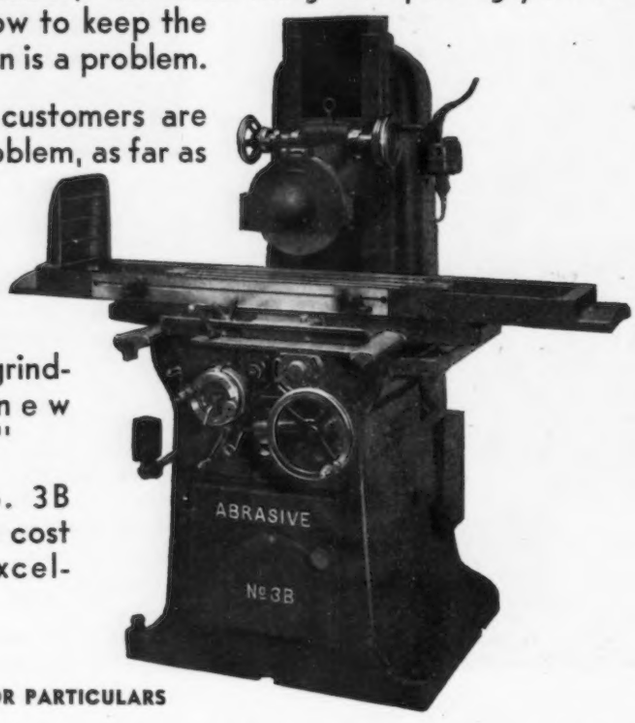
Something

Must Be Done About It

Higher labor costs, higher materials costs, higher taxes, lack of skilled labor,—all these things are putting you "on the spot." How to keep the total cost down is a problem.

Many of our customers are solving this problem, as far as their Surface Grinding costs go, by replacing their obsolete surface grinders with new "ABRASIVES."

Our new No. 3B machine is a cost saver par excellence.



WRITE FOR PARTICULARS

ABRASIVE MACHINE TOOL CO.

East Providence, R. I.

week with a luncheon attended by more than 800 of the city's leading business, industrial and civic leaders. The occasion was sponsored by the Pittsburgh Chamber of Commerce and WILLIAM P. WITHEROW, president, Blaw-Knox Co., Pittsburgh, acted as toastmaster. Mr. Perry expressed his pleasure in going to Pittsburgh and paid tribute to Benjamin F. Fairless, his predecessor, now president of the United States Steel Corp. of Delaware.

R. J. WORKING

WALTER J. STUMPF, who has been identified with George L. Mesker & Co., Inc., Evansville, Ind., since 1904, has been appointed general manager, succeeding HENRY F. KOCH, who held that position for about 27 years.

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BENJAMIN F. FAIRLESS, president, United States Steel Corp., and JOHN L. PERRY, president, Carnegie-Illinois Steel Corp., will be guests of the officers and directors of the Engineers Society of Western Pennsylvania, Pittsburgh, at a dinner on Feb. 15. About 80 presidents and board chairmen of leading Pittsburgh concerns will be in attendance. Later in the evening all will be guests at an annual reception for installation of the engineers society president-elect, C. E. LESHER, executive vice-president, Pittsburgh Coal Co.

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SMITH L. RAIRDON has been named vice-president and general sales manager and a member of the board of directors of Owens-Illinois Can Co., Toledo, Ohio. Mr. Rairdon has been Eastern sales manager for the Glass Container Division of Owens-Illinois Glass Co., with headquarters in New York.

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LOUIS M. LIND, chief of the Machinery Division, Department of Commerce, was scheduled as a luncheon speaker at the annual meeting of the Foundry Equipment Manufacturers' Association in Cleveland, Feb. 8, on "Foundry Equipment Builders and the Government."

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GEORGE J. HAAS has been appointed service manager of the Stran-Steel Division of the Great Lakes Steel Corp., according to KARL A. DIETRICH, general manager. Mr. Haas, a past-president of the Michigan Society of Architects, served for nearly two years as the assistant project manager to the United States Housing Authority at the Parkside project in Detroit and the Brand Whitlock homes project in Toledo. The department he will head at Stran-Steel is a new one devoted to the dissemination of product information to architects, builders, housing groups and lumber dealers.

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W. M. JEFFERS, president, Union Pacific Railroad, Omaha, Neb., will be principal speaker Feb. 17 when the

Make LIGHT WORK of LONG JOBS with STARRETT DIAL INDICATORS

Any way you work it, it's a long, slow job checking the cutting edges of a broach — but this man knows the fastest and the easiest and the most accurate way to do it. He's using a Starrett LAST WORD Dial Indicator Model D-10 mounted on a Starrett Vernier Height Gage by means of a Universal Shank. It can be set up in a matter of seconds and the sensitive action and big, honest face make measurements in ten-thousandths unusually rapid and error-proof.

There's a wide choice of models, sizes and dial calibrations in the complete line of STARRETT and LAST WORD Dial Indicators shown in the Second Edition of Starrett Dial Indicator Catalog AA. Would you like a copy?

THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.

World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—Steel Tapes, Standard for Accuracy Dial Indicators for Every Requirement

Standardize on STARRETT TOOLS

BUY THROUGH YOUR DISTRIBUTOR

annual dinner of the Traffic and Transportation Association of Pittsburgh is held at the William Penn Hotel, Pittsburgh. E. E. ALLISON is general chairman, F. R. BOYLAN, chairman of the speakers committee, J. N. LIND, reception committee chairman, and EMILE THEODORE, in charge of reservations.

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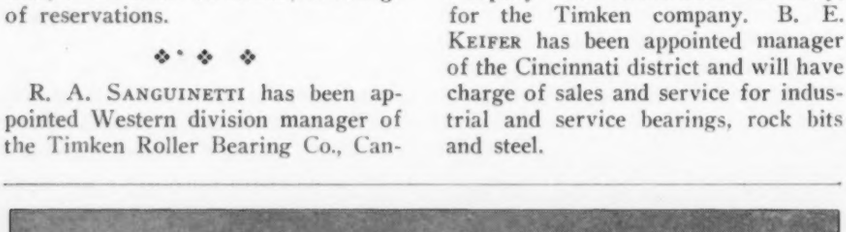
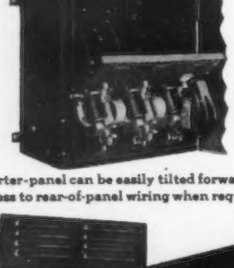
R. A. SANGUINETTI has been appointed Western division manager of the Timken Roller Bearing Co., Canton, Ohio, in charge of sales of industrial, automotive and service bearings, rock bits and fuel injection equipment. His headquarters will remain in San Francisco. P. T. ANCARROW has been appointed Atlanta division manager in charge of all phases of activity of the company in the southeastern territory, for the Timken company. B. E. KEIFER has been appointed manager of the Cincinnati district and will have charge of sales and service for industrial and service bearings, rock bits and steel.

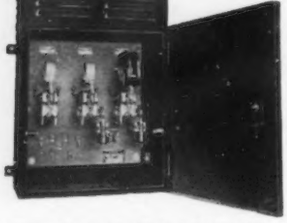


EC&M Simplifies the Starter Problem

Only ONE Starter for many Horsepower sizes



Starter-panel can be easily tilted forward for access to rear-of-panel wiring when required.



Line, motor and control wire terminals are on the front of the panel. Ventilated enclosure protects resistors.

This Standardized Unit for 5-25 H.P. motors proves valuable ally to D-C motor users.

NOW only one starter of mill duty construction required for many horsepower sizes—reduces spare part problem—makes it possible for users having many motors in this range to stock only one unit as a spare for replacement or emergency addition.

It is a matter of only a few minutes after taking one of these EC&M Bulletin 1083 Type RD Starters from the store-room to adapt it from one horsepower rating to another. Each unit is provided with ample resistance and a sufficient number of taps to permit quickly connecting the resistors to give the proper value of starting torque for the motor with which the starter is to be used. And acceleration time which is provided by definite time relays can be easily lengthened or shortened as needed by simply turning thumb screws conveniently located on the front of the starter-panel.

These starters are built in four sizes. The two smaller sizes for motors from 5 to 25 HP and from 26 to 35 HP are arranged for wall mounting and with provision to tilt the panel forward as shown. The two larger sizes are arranged for floor mounting and have resistors designed for the motor with which they will be used.

Investigate these heavy duty, direct current motor starters today. Write now for a copy of Bulletin 1083 giving complete information.

Similar Starters Built for Motors 26-35 H.P.

THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS

C. M. ROBINSON, National Acme Co., Cleveland, has been elected president of the Cleveland Electrical Maintenance Engineers' Association. ROY STEVENSON, Lamson & Sessions Co., has been elected chairman of the industrial plants section; A. J. BREWER, General Electric Co., will be secretary, and ORLAND LOOMIS, Aluminum Co. of America, treasurer.

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R. W. CHANDLER has resigned as director of research and engineering, Graton & Knight Co., Worcester, Mass. During his 10 years in this post, Mr. Chandler was a moving spirit in organizing the modern group drive idea, assisted in forming the Power Transmission Council, and served for several years as chairman of the executive committee of the council. Mr. Chandler has not announced his plans for the future, but it is believed that he will return to the public utility field.

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Ross B. TREER, for many years associated with Cleveland Punch & Shear Works Co., Cleveland, in an engineering capacity, is now with Logansport Machine, Inc., Logansport, Ind., as chief engineer.

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J. M. SPENCER has been promoted to the presidency of the Hobart Mfg. Co., Troy, Ohio, succeeding the late H. L. Johnston. EDWARD C. JOHNSTON, son of the former president, and superintendent of the Dayton plant, will succeed his father on the board of directors. DAVID A. MEEKER, Troy, has been appointed vice-president, succeeding Mr. Spencer.

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HARRY W. ELLIS, associated with the Johnson Service Co., Milwaukee, manufacturer of temperature control systems, for 43 years, on Feb. 1 retired as president and general manager to become chairman of the board. He is succeeded by J. A. CUTLER, Chicago, formerly vice-president and sales manager. C. G. WARD, manager of the Denver office, succeeds Mr. Cutler at Chicago. M. F. RATHER has been appointed manager of the eastern district office in New York to fill the vacancy caused by the retirement of KENNEDY DUFF.

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HARVEY B. BOWER has been elected vice-president in charge of the newly established Milwaukee branch of the Chicago-Latrobe Twist Drill Works at 910 North Fourth Street, Milwaukee.

CHARLES B. PATT, assistant superintendent at the Donora, Pa., works of American Steel & Wire Co. for over five years, has been appointed superintendent of the company's Allentown, Pa., works, succeeding the late James S. Phifer. Mr. Patt started working for the Wire company in September, 1905, employed as a clerk in the order and warehouse department. He filled various positions with the company and in 1931 was appointed manager's representative at Pittsburgh, which post he held until being made assistant superintendent at Donora in September, 1932. Mr. Patt attended Doane Academy at Granville, Ohio, and later was graduated from Denison University.

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RALPH PETILLON has resigned as purchasing agent of Western Pipe & Steel Co., San Francisco, after nearly 25 years with the firm, to become general manager of Ducommun Metals & Supply Co. STUART ROSE, assistant purchasing agent, succeeds him. ALAN MCLEAN will be assistant to Rose in the San Francisco office.

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FRANK H. DEWEY, general manager of the air conditioning division of Gar Wood Industries, Inc., Detroit, has been appointed president of the Oil Burner Institute to fill the unexpired term of CHARLES M. LOCKWOOD of Rock Island, Ill., who resigned.

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DR. WILLIAM N. BARNARD, since 1907 professor of heat-power engineering at Cornell University, has been named director of the Sibley School of mechanical engineering in the College of Engineering of Cornell University. He was graduated from that university in 1897.

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RALPH JOHNS has been made manager of sales of the Sharpsville Boiler Works Co., Sharpsville, Pa. DONALD E. JARMAN, for several years identified with the Dow Chemical Co. as research welding engineer, has been appointed alloy design and welding engineer in the technical service of the company. RALPH J. BENS has been appointed district sales manager in New York, ROBERT JOHNS has been appointed to a similar post at Detroit, EMERSON MULFORD at Akron, JOHN J. GREEN at Hollidaysburg, Pa., and L. L. GUTHRIE, Pittsburgh.

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A. G. ZIMA, who is field research representative on the West Coast for International Nickel Co., Inc., New York, is scheduled to address the Seattle chapter of the American Society for Metals on Feb. 9 at the Roosevelt Hotel on "The Role of Nickel in the Development of Modern Cast Irons."

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BLAINE FAIRLESS, son of the president of the United States Steel Corp., has joined the Jones & Laughlin Steel Corp., as an inspector at the Aliquippa, Pa., mill.

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ARTHUR J. O'CONNOR, for 39 years identified with the Hunt-Spiller Mfg. Corp., Boston, has retired. He has been foundry superintendent for the past 25 years.

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A. V. BERTHOLD, formerly assistant general superintendent of the West Virginia Rail Co., Huntington, W. Va., and more recently civilian plant superintendent in the Naval Aircraft Factory, Philadelphia, has been appointed plant manager of the Sweet's Steel Co., Williamsport, Pa.

(CONTINUED ON PAGE 86)

A Score of Industries Prove the Economy of

WHITCOMB LOCOMOTIVES

Extend your economy program to your yards with Whitcomb haulage power. The saving becomes a part of your profits. Whitcomb Locomotives, powered with internal combustion, or electric units, provide rapid, flexible, haulage power—rugged power that stands up for years and years with little upkeep cost. One man hauls many loads. No standby fuel losses.

Over 32 years' experience in industrial locomotive development gives our locomotives unusual qualities.

Without obligation to you, our engineers will estimate your haulage needs and quote the cost of suitable Whitcomb equipment.

A SIZE AND TYPE OF POWER TO SUIT YOUR NEEDS

Gasoline or Diesel Mechanical Drive
Gasoline or Diesel Electric Drive
Electric Storage Battery
Electric Trolley
Combination Trolley—Storage Battery

THE WHITCOMB LOCOMOTIVE COMPANY
Plant at Rochelle, Illinois

Subsidiary of The Baldwin Locomotive Works. All sales made by The Baldwin Locomotive Works, Paschall Station Post Office, Philadelphia, Pennsylvania.

. . . NEWS OF THE WEEK . . .

Restore Incentive and Business Will Prosper, Says C. R. Hook

THE business future is brighter than it has been in months because "there is on the part of Congress a more sympathetic attitude toward business and a better understanding of the factors which caused the current recession," said Charles R. Hook, president of the American Rolling Mill Co., Middletown, Ohio, and president of the National Association of Manufacturers, in an address Monday evening, Feb. 7, before the Engineers' Society of Western Pennsylvania in Pittsburgh.

Mr. Hook said that billions of dollars of idle capital will be released for investment and millions of jobs will be created once the "extraordinary handicaps that have been unloaded on business incentive are removed." He said that cooperation between the Government and business is "absolutely essential if we are to solve our very serious problems.

"Such cooperation," he added, "must be aimed at aiding all business—large and small, producers and distributers alike—for they go forward or halt under similar conditions. All depend upon the buying of the public. All depend upon the confidence of the small investor to make capital available. All must be able to chart the future with some degree of certainty, with due regard for the natural hazards of business, before they can undertake the expansions upon which new employment depends."

Mr. Hook asserted there could be no cooperation toward these objectives unless there was a willingness on both sides in any given situation to "sit down with an open mind and study all the facts."

"The first objectives are re-establishment of business activity and re-employment," Mr. Hook said. "And where reforms are necessary, they must be drafted so as not to obstruct the functioning of legitimate business.

Another Upward March Possible

"The economic factors to set us off on another upward march are at hand," Mr. Hook said. "We have in this country the machinery, money, technique, ability and courage to succeed. Piled up behind the fears and uncertainties as to what the legislative future holds are billions of dollars in idle capital and millions of jobs. There are dollars enough and jobs enough to dwarf any amount of money that might conceivably be spent by Government upon relief or job making. Our task is then to mobilize our tremendous resources into a marching force toward recovery.

"And these resources will unloose themselves with the force of a Niagara if we can lift the major handicaps that have been loaded upon business incentive.

"Provide the conditions under which capital of large and small dimensions will go out looking for a profitable return, give the investor assurance that his savings will not be penalized, protect private enterprise against Government competition and there is work enough ahead in America to keep every man-jack of us busy for years to come.

"To state that America is overproduced, overbuilt, oversold is the sheerest tommyrot. It has been estimated that in the durable goods industries alone annual production at the rate of 33 billions of dollars a year would be required until 1941 to re-establish production on a 1929 plane. This would give employment to eight or nine million additional men.

"There, in those figures, is written the future of America if we but have

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the vision, the common-sense to reach out and take that which we know is there.

"There is written the end of the present depression.

"There in those figures is written the answer to our millions who seek work.

"And there is written a challenge to us as business men—to Government—to all groups that we cooperate to the best of our abilities that we may go forward to a better plane of living for all our people.

"I know that I speak for the manufacturers of the country when I say that they will give their best efforts to end this depression."

Capital Lacks Incentive

Mr. Hook pointed out that private funds have not flowed normally into the development of industry during the past several years because the "necessary incentives are lacking."

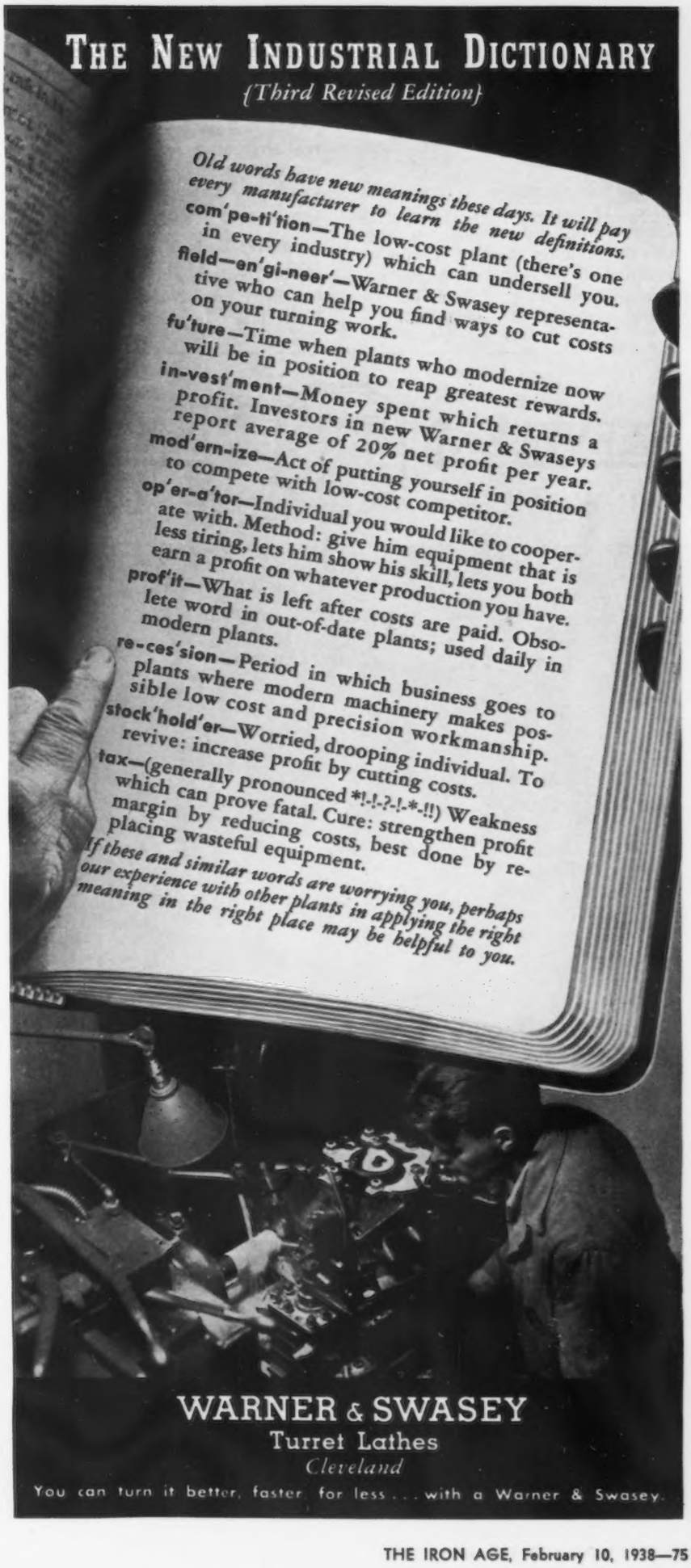
"Excessive and unwise taxation, restrictive legislation, government competition with private enterprise and unwarranted abuse of industry are militating against that steady flow of earning which is industry's life blood," the speaker said. "The extent of the possible damage is far greater than most people think, for attacks against industry do not fall against the imaginary 'few,' but strike with brutal force against the multitudes.

"What at first was thought to be a temporary recession has all the earmarks of becoming a real depression, unless certain Governmental obstructions to recovery are removed. That is not to say that all legislation is obstructive. There unquestionably are existing evils which ought to be corrected. Manufacturing industry and business in general are in sympathy with measures drafted and enacted to protect the public interest and punish those who fail to administer their trust honestly."

Urging outright repeal of the undistributed profits tax and drastic modification of the capital gains tax, Mr. Hook said he hoped that through such action "Capital which was forced into hiding in the form of tax-exempt securities will come out and resume its useful purpose of financing industrial improvement and expansion."

The speaker defended what he termed the "incentive system," under which industry operates in the United States and deprecated attempts to substitute "some Utopian adventure, such as state socialism or collectivism."

"The incentive system that properly rewards individual initiative, ability


THE NEW INDUSTRIAL DICTIONARY
(Third Revised Edition)
Old words have new meanings these days. It will pay every manufacturer to learn the new definitions.
com'pe-ti'tion—The low-cost plant (there's one in every industry) which can undersell you.
field—en'gi-neer'—Warner & Swasey representative who can help you find ways to cut costs on your turning work.
fu'ture—Time when plants who modernize now will be in position to reap greatest rewards.
in-vest'ment—Money spent which returns a profit. Investors in new Warner & Swaseys report average of 20% net profit per year.
mod'ern-ize—Act of putting yourself in position to compete with low-cost competitor.
op'er-a'tor—Individual you would like to cooperate with. Method: give him equipment that is less tiring, lets him show his skill, lets you both earn a profit on whatever production you have.
prof'it—What is left after costs are paid. Obsolete word in out-of-date plants; used daily in modern plants.
re-ces'sion—Period in which business goes to plants where modern machinery makes possible low cost and precision workmanship.
stock'hold'er—Worried, drooping individual. To revive: increase profit by cutting costs.
tax—(generally pronounced *!-!-?-!-*-!!) Weakness which can prove fatal. Cure: strengthen profit margin by reducing costs, best done by replacing wasteful equipment.
If these and similar words are worrying you, perhaps our experience with other plants in applying the right meaning in the right place may be helpful to you.
WARNER & SWASEY
Turret Lathes
Cleveland
You can turn it better, faster, for less . . . with a Warner & Swasey.

and thrift—the system which has given America the highest general standard of living the world has ever known—is the only system which has stood the test of time," Mr. Hook said.

"The only alternative to incentive is force. If you want the people of a nation to work and produce, you either have to encourage them by offering an incentive in the form of wages, opportunity and material gain, or else you have to compel them by military force, oppression and dictatorial 'strong arm' tactics.

"I am confident that the American people will understand that the only real alternative for the incentive system is a system of state servitude, regimentation, compulsion and bayonet rule."

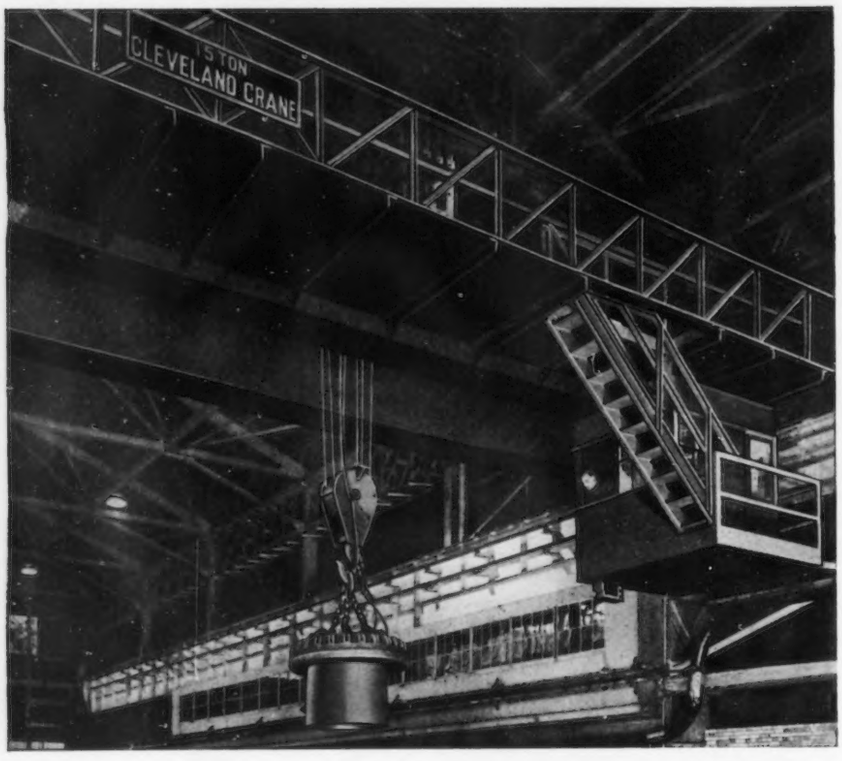
Industry Fails in Telling Its Story

The speaker, who for twenty years has been an advocate of the "open book" policy in industry, said that industry had failed badly in telling its story—and contended "it is absolutely essential that the general public be constantly informed of the various problems confronting business if we are to bring about an understanding in the public mind of the proper relationship of Government and Business under the 'incentive system'.

"But if industry is to have its side of the story accepted by the public," he concluded, "it must be as ready to expose abuses in its own ranks and condemn improper business practices as it is to oppose legislation and regulation which is obstructive to business progress. It must show unimpeachable good faith. The place to begin is at the 'grass roots.' The attitude toward business in the nation as a whole is only the reflection of what people think of business in the local communities in which it operates. The way to win confidence in, and respect for, all of industry is for each component part to be a good, honorable, desirable 'citizen' at home."

CLEVELAND CRANES

All Welded for Every Industry



• A 15 ton 63' 6" span all welded Cleveland Crane in the new Strip Mill of the Jones and Laughlin Steel Corporation. This is one of many Cleveland Cranes in the various plants of this Company.

ALSO BUILDERS OF

CLEVELAND TRAMRAIL

THE CLEVELAND CRANE & ENGINEERING CO

1115 Depot St.

WICKLIFFE, OHIO

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MATERIALS HANDLING EQUIPMENT

Lake-River-Ocean Freighters Planned

SIX new 300-ft. diesel-powered freighters have been designed by Gielow, Inc., New York, for Atlas Motorship Line of New York for a new lake-river-ocean freight service. The vessels, with 12 ft. 6 in. draft and maximum capacity of 3300 tons, will have cranes for self-unloading and a pilot-house on hydraulic jacks, capable of being lowered into the hull for passage through canal bridges.

The route will be via Albany and Oswego, New York, through Lake Ontario ports, the Welland Canal and Lake Erie, around the lakes to Milwaukee and Chicago, then down the Illinois-Mississippi system to the Gulf and through coastal waters back to New York.

Non-Union Workers Are Threatened By Golden

CLINTON S. GOLDEN, SWOC regional director at Pittsburgh, recently threatened steel workers not joining the John L. Lewis organization. He told a Hazlewood, Pa., mass meeting:

"The time will come when the minority which doesn't want a union will have to abide by the will of the majority and have one. Some day we will have to go to the bosses' office to keep the minority with the majority."

Steel Industry Plans to Spend 165 Millions on Plants in '38

STEEL industry expenditures for new equipment and construction will total at least $165,000,000 during 1938, according to reports to the American Iron and Steel Institute from 120 companies comprising more than 90 per cent of the total capacity of the industry.

During 1937 the industry spent approximately $320,000,000 for such purposes, or about $30,000,000 more than the amount estimated by the industry in January, 1937, as the sum to be spent for new equipment during that year.

The prospective decline from the 1937 total reflects not only the current low level of operations, but also the fact that many companies completed large expansion programs during 1937. For example, three continuous mills for hot-rolled products, costing more than $20,000,000 each, were completed last year, whereas only one such mill is now under construction.

Announcement of the expected expenditures of steel companies in 1938 for expansion and improvement of properties raises the total spent or to be spent for such purposes in the four years 1935-1938 to more than $840,000,000. Of this sum, approximately $140,000,000 was spent in 1935; about $216,000,000 in 1936, and $320,000,000 last year.

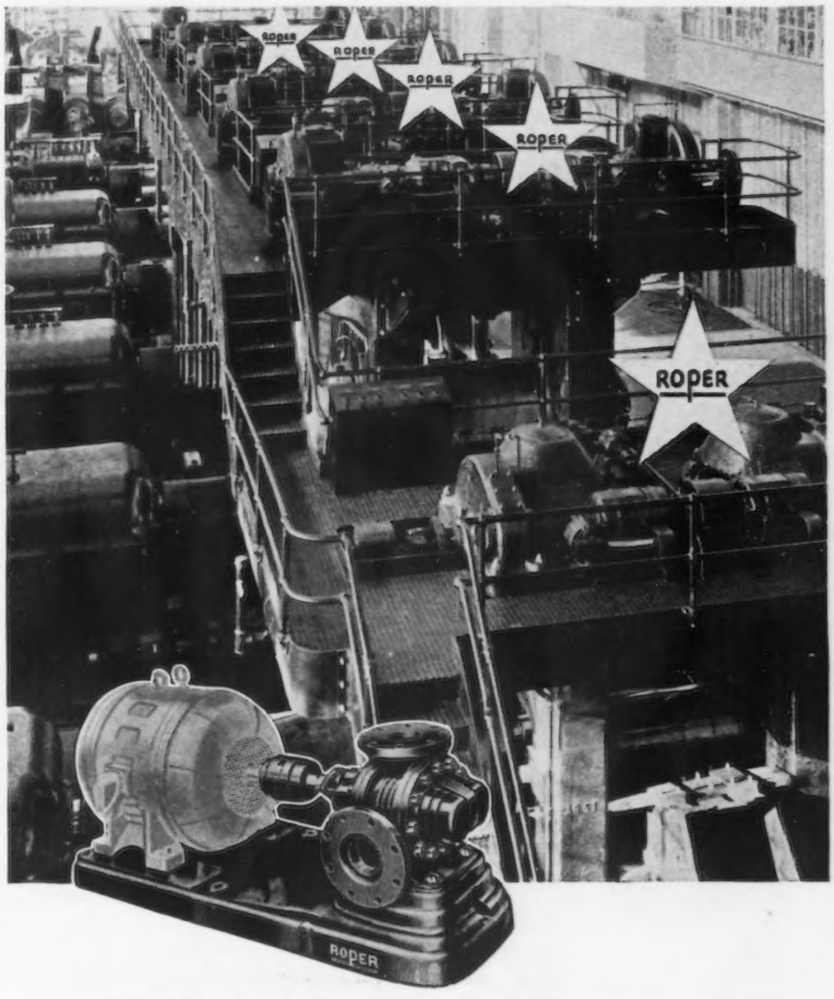
The possibility that more than $165,000,000 may be spent for new equipment during 1938 is indicated by statements from a number of companies that their expenditures might increase if business conditions improve sufficiently and if there is an early revision of the provisions of tax laws which now discourage the use of earnings for such expenditures.

British Broaden Search For New Markets For Steel

LONDON (*By Mail*).—With the object of developing new markets for steel, the British Steelwork Association has been reconstituted on a broader basis. Its membership now includes the British Iron and Steel Federation, the Heavy Steelmakers' Association, British Constructional Steelwork Association and the Sheet Makers' Conference.

James Henderson, past president of the British Iron and Steel Federation and a director of United Steel Companies, has been appointed president of the association, and Geoffrey Summers, a director of John Summers & Sons, vice-president.

The reorganized association plans to carry out experimental and research work with the object of creating new applications for iron and steel in all their manifold forms. There will be close contact with the corresponding bodies in Continental Europe and the United States.



THE "STARS" SAY ★ ★ ★

Another Successful Mill Installation by ROPER

Wherever you go these days in steel making circles, you run into Roper installations. The stars here indicate Roper Pumps used for lubricating screwdowns. The pinion gears at left are also lubricated under pressure by Roper Pumps.

Let us have your inquiries for pumps of ALL types and sizes.

GEO. D. ROPER CORPORATION ROCKFORD, ILLINOIS

Offices: Pittsburgh and other principal Cities

ROPER *Rotary* PUMPS

DEPENDABLE SINCE 1857

TORONTO
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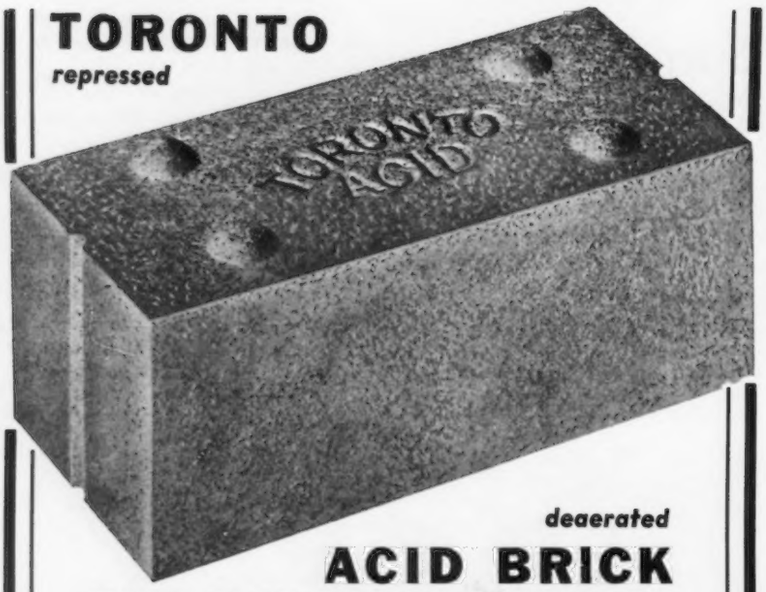

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ACID BRICK
FOR USE WITH BASOLIT

Tank walls and floors laid up with Toronto Acid Brick and Basolit, the acid-proof cement joint, are *really* acid proof. Repressed, deaerated, dense and impervious to any acid action, Toronto Acid Brick are precisely molded in stock and special shapes. Accurate spacing buttons and end grooves insure uniform self-anchoring joints at minimum labor costs. Write for free samples and full information.

THE KEAGLER BRICK COMPANY
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Fire Clay, Acid Resistant Brick, Fire Clay Mill Brick, Pickling Tank Linings, Acid Proof Construction, Paving Brick, Paving Block, Chimney Stack Brick.

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For 75 Years the Standard of Dependability in

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ESTABLISHED 1863
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YEARS OF SERVICE TO INDUSTRY
1863 - 1938
OLIVER

OLIVER IRON AND STEEL CORP.
PITTSBURGH, PA.

Increase In Krupps' Output and Profits

LONDON (*By mail*).—A record of energetic developments at Krupps is given in the firm's annual report, just issued. During the past year there was a further increase in output, employment, and assets on the same scale as that which has been reported regularly every year since the National-Socialists came into power.

In 1932, for example, 46,000 men were employed. In 1936 there were 98,000. At the end of the last financial year (on Sept. 30) there were 109,000. The wages paid in 1936 were 153,000,000 marks, while last year they rose to 172,000,000 marks. Perhaps most striking of all is the increase in the firm's assets by 70 per cent, rising from 389,000,000 marks in 1932 to 575,000,000 marks in 1937 ($240,000,000). The amount of taxes paid increased by almost 10,000,000 marks during the past year. A dividend of 5 per cent, amounting to 8,000,000 marks, was paid out to the Krupp family—the fruits of a recorded profit of 16,000,000 marks ($6,500,000), compared with 14,000,000 marks the previous year.

The firm lays emphasis on the great increase in exports, although it complains that it has at times lost money on sales abroad. Exports were up by 2 per cent as a result of large contracts for railroad equipment, especially to Argentina, India, Italy, China, Switzerland, Turkey, and South Africa. The report adds significantly that the firm has been "regaining its reputation abroad as an arms manufacturer."

Caterpillar Annual Report For '37 Goes To Employees

CATERPILLAR TRACTOR CO., Peoria, Ill., recently issued its annual pamphlet report, illustrated with photographs and drawings, to both employees and stockholders with the following comment:

"Not only have employees many interests in common with stockholders, but it would seem that perhaps much good might come if the employees, as well as stockholders, were possessed of information regarding operations of the company . . . the better to weigh the various economic, social and political theories now being so generally discussed."

A.S.T.E. Members To Get Convention Mileage Rebates

PROCEEDS from the American Society of Tool Engineers' machine and tool progress exhibition at Detroit's Convention hall March 9-12 will be paid in mileage rebates to society members attending to help meet traveling expenses, Frank A. Shuler, president, announced.

"The machine and tool progress exhibition is already in the black," Mr. Shuler said. "We have decided to use the proceeds in making it easier for production men from all over the country, who are members of our society, to come to Detroit.

F. A. SHULER

"A.S.T.E. members will be responsible for many millions of dollars worth of new equipment purchases during 1938 and want to know what is new . . . by direct observation."

A high percentage of the shows exhibits will include machinery, tools and equipment in actual operation. Membership of the A.S.T.E. consists largely of production executives responsible for the purchase, selection, design and supervision of machines, tools and production equipment in mass production industries.

Allan & Klaile Mfg. Co., 177 Vanderpool Street, Newark, N. J., manufacturer of iron and steel products, machinery, etc., has taken over C & K Mfg. Co., formerly located on Railroad Avenue. Operations of both companies will be concentrated at Vanderpool Street plant. W. Klaile is president and W. B. Allan, secretary.

A Leader Must Lead

AGAIN *and* AGAIN

One sterling dive never won a championship. Highest recognition comes only after outstanding performance has been repeated again and again.

Again and again, to industry after industry, Lebanon Steel Foundry has performed outstanding services. The corrosive effect of acid mine waters gave headaches to operators of coal mines until pump parts, valves and pipe fittings of Circle L 31 licked this tough problem.

When castings of Circle L 30 stepped into the paper and pulp industries, corrosion from sulphite liquors stepped out.

The use of non-magnetic, stainless Circle L 22 is preventing plenty of trouble in the food, marine and other industries.

Lebanon has earned the right to be first on your list of those with whom you discuss steel castings. You will find Lebanon engineers skilled co-operators.

LEBANON STEEL FOUNDRY

EXCLUSIVE AMERICAN LICENSEE FOR GEORGE FISCHER METHOD SCHAFFHAUSEN, SWITZERLAND

CIRCLE L

LEBANON, PENNA.

Stainless and Special Alloy Steel Castings

Cooperation of Workers Essential in Methods Engineering

IN any consideration of methods engineering, including time and motion studies, the problem of arousing worker interest must not be overlooked. Without suitable explanation, a plant method study is likely to be looked upon by the workers as a "speed-up" in another guise. Such was one of the viewpoints expressed by Harold B. Maynard, president of the Methods Engineering Council, Pittsburgh, when he spoke before the Detroit chapter of the Society for the Advancement of Management at the January meeting. His talk on "The Foreman's Part in Motion Study" was preceded by an introduction from Clayton Hill, manufacturing manager of the Murray Corp. of America.

"Properly understood, methods engineering is found to advocate the things that labor itself wants—good conditions, non-fatiguing methods, fair production standards and the intelligent handling of the training problem. Where labor is organized, the inclusion of union representatives in the methods study training program accomplishes two important results. First, any suspicion that something objectionable to labor is going on is allayed at once. Second, the representatives of labor are given a true picture of methods engineering and, because the procedure contains nothing detrimental to the interests of labor, they eventually give it their support. Some of them, in fact, have gone into methods work themselves, feeling that they were advancing the interests of labor by assisting the progress of a procedure which is essentially fair and just."

He cited several current cases of training programs in Detroit and in the steel area near Pittsburgh where union representatives were being trained along with plant personnel. He also cited a case of a department which handled a wide variety of miscellaneous work so that it became advisable to use motion pictures and lectures to train the entire personnel in the superiority of skill over speed.

Whatever may be the effects of changing labor attitudes, governmental policies and all the other present-day variables, the organization which knows how to produce most efficiently is in the best position to cope with whatever occurs, Mr. Maynard declared. Industry now is seeking this efficiency through means which only a few years ago were considered too impractical to be of value in production work. This new attitude, Mr. Maynard said, was expressed almost a year ago by the manufacturing manager of a Detroit company who said: "The day has passed when we can obtain our production increases from the backs of our workers. In the future that must come from the heads of our supervisors."

Method study was defined as the technique which seeks production increases by increasing the effectiveness of labor rather than by increasing effort. Mr. Maynard advocated a program in which the foremen are trained to correct the more obvious inefficiencies and cooperate with methods engineers to eliminate unnecessary steps and lost motions.

NO QUESTION about Oilgear Surface Broaching Machine PERFORMANCE
•One or more pieces finish-broached simultaneously
•Highest production at close tolerances
•Each unit complete and self-contained
•Single lever, semi-automatic control
•Automatic full interlock of broach and shuttle tables
•Welded all-steel construction
•6, 10, 16, 20 ton capacities
The Oilgear Variable Delivery Pump has enough long and exacting service behind it to demonstrate beyond question its greater smoothness of operation, its greater dependability of performance, what it means in reduced maintenance costs. And just as you would expect, this famed pump, applied to Oilgear Surface Broaching Machines, is setting new high marks in production at the closest tolerances desired. For what Oilgear means in terms of *your* problems, write for full information including Bulletin 23,000A. THE OILGEAR COMPANY, 1303 W. Bruce St., Milwaukee, Wis.
OILGEAR SURFACE BROACHING MACHINES

Flame Hardening Discussed At Welding Society Meeting

THE technique and theory of selective hardening of machine parts with the oxy-acetylene flame were discussed at the January meeting of the Detroit section of the American Welding Society by H. John Sheppard, metallurgist at Kelsey-Hayes Wheel Co. More than 250 members and guests were in attendance. William Hayes, of the Air Reduction Sales Co., introduced Mr. Sheppard in the absence of Vaughan Reid, the Detroit section chairman.

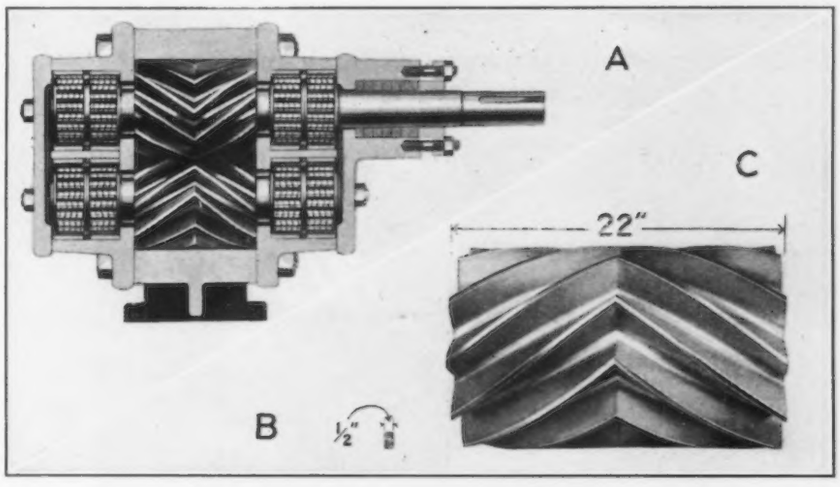
The development of suitably water-cooled tips and torches to insure dependable operation in hardening localized areas is of recent date and has made possible the use of the oxy-acetylene process of selective hardening in the machine industry. In hardening with a flame, Mr. Sheppard said, three factors determine the effects: the steel analysis, the rate and duration of heating and the rate of quench. Water soluble oils and compressed air offer a range of quenching media which vary in the rate at which they absorb heat from an object. The speaker asserted that plain carbon steels above 0.35 per cent carbon are readily hardened with flame. Standard SAE low alloy steels containing manganese, chromium, nickel and silicon in concentration from 0.50 to 2 per cent can be readily hardened with carbon content as low as 0.25 per cent. By increasing the carbon content, greater hardness is obtainable. The depth of penetration varies from ⅛ to ¼ in., depending largely on the rate and time of heating. The hardness varies with the steel analysis and the severity of the quench.

"Rail steels containing 0.80 per cent carbon with an original Brinell of 220 are flame hardened to 450, with a very mild quench," Mr. Sheppard said. "Rapid quench of such steels yields hardness at the very limit of the hardness scale which is over 700 Brinell and is equivalent to the hardness of common hard-faced materials. The SAE low alloy steels with carbon at 0.35 per cent can be hardened to 500 Brinell with a moderate quench. In hardening high-carbon steels in the tool steel range, care must be exercised to avoid surface cracks or checks either from a too rapid application of heat or a too severe quench."

Certain semi-steels and low alloy cast irons common to machine construction can be flame hardened. In general their hardening procedure is not as well developed as in the case of steels and may require experimental work to determine the probable rates of heating and quenching. For many machine parts such as gears, etc., air-hardening steels SAE 4140, 4640, 6140, etc., can be used. These require no quench other than cooling in still air to obtain hardening after heating.

Can Be Done Automatically

Flame hardening can be accomplished either manually or automatically. Mr. Sheppard illustrated with pictures the hardening of rail ends with a standard heating torch. In order to harden extended strips of metal such as the entire running surface of the rail the torch is mounted on a mechanically driven machine. The operations of heating and quenching are



2 GALLONS PER MINUTE *or* 2000 *with* SYKES HERRINGBONE PUMP ROTORS

Sykes continuous tooth herringbone gears have found an extensive use as pump rotors in a wide range of sizes and capacities, as illustrated by the two extremes shown above.

The smaller of the two pump rotors (Fig. B) is 1.083" O.D., ½" face, 24 D.P., and is one of a pair used in a pump having a capacity of 2 G.P.M. at 1750 R.P.M. The large rotor (Fig. C) is 13.991" O.D., 22" face, 1 D.P., and is the largest pump impeller made to date. This is one of a pair used in a Worthington pump for pumping bunker fuel oil. The pump has a capacity of 2,000 G.P.M. at 292 R.P.M., with 100 lbs. pressure and 14" suction and discharge.

Fig. A shows a longitudinal section of a Worthington Rotary Pump with Sykes rotors mounted in double roller bearings.

Sykes herringbone pump rotors are precision generated and, when properly fitted in a pump housing, run silently at high speeds. There is no end thrust and no trapping of liquid; they give high volumetric efficiency and uniform flow without appreciable pulsation.

Pump manufacturers and users are invited to send for engineering data giving rotor sizes, materials, formulas for determining capacities and other information. A request on your letterhead will bring this data without obligation.

FARREL SYKES GEARS

FARREL - BIRMINGHAM COMPANY, Inc.
333 VULCAN STREET - - - - BUFFALO, N. Y.
The Gear with a Backbone

combined in a tip containing both heating and quenching holes. Penetration is determined by the size and spacing of heating holes, the gas pressures and rate of travel of the tip over the surface to be hardened.

When the width of surface to be treated is great, a relatively narrow tip is used, making a series of overlapping passes. By the use of an additional quenching stream at the overlapping side of the tip, the flow of heat from the heating flames to the area already hardened can be prevented, eliminating a soft streak at the pass overlap.

Cylindrical surfaces being flame hardened were illustrated with the flame hardening tip in a lathe tool post. Objects of less than 6 in. diameter can be hardened by rotating the object at a speed of about 100 r.p.m., heating the entire surface to the required temperature by means of a heating tip without quenching stream. After removing the torch a quenching stream can then be applied to the rotating work. For larger diameters, combination tips are used. For this type work the relative speed of the torch and work should be about 6 in. per min., according to Mr. Sheppard. An auxiliary quenching stream ahead of the heating flames prevents drawing of the hardness at the completion of the circle.

The hardening of gear teeth was put forth by Mr. Sheppard as one of the simplest applications of the flame hardening principle. Since only a limited area on both sides of the tooth at the pitch line must be hardened, it is possible to harden gears with practically no distortion. Small gear teeth can be hardened by using standard two-flame heating tips bent pincer shape so a single flame plays on either side of the gear teeth at the pitch line. This is applied to the gear teeth successfully until the cycle has been completed. Multi-flame water cooled tips are used for the larger gear teeth.

Among other applications introduced by Mr. Sheppard is the hardening of bearing surfaces, cams, valve seats, worms and the bearing surface of a 60-in. locomotive crosshead guide. He also showed the hardening of an integral pinion shaft for a mill gear unit and the hardening of blooming mill table mitres. In the latter case there were 33 teeth with 70-in. face made of a cast chrome-molybdenum (0.50 carbon, 1.10 manganese, 1.00 chromium, 0.35 molybdenum). The original material was oil treated and drawn to 250 Brinell and flame hardened to 650-750 Brinell. More than 250 of these gears had been hardened in one shop and some have been in service more than three years.

Day and Night . . . Month after Month, You Can Depend on

GARLOCK 150 is recommended for general use against high temperatures and high pressures up to 300 lbs. Try it on piston rods and expansion joints in your plant—you'll like its dependable performance.

GARLOCK 150

The ever-burning light and the ever-tolling bell of the channel buoy are depended upon night and day, through fog or storm, to save lives and cargo. As dependable as the channel buoy is GARLOCK 150 High Pressure Steam Packing. On land and on sea, its reliable quality and long life save time and money by preventing costly shutdowns for frequent re-packing.

THE GARLOCK PACKING CO., PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada, Limited, Montreal, Que.

Survey Shows Fear Obstacle To Building

TWO hundred and seventy-five companies in the United States are holding up almost $200,000,000 worth of industrial plant and factory construction for three principal reasons, a survey by H. K. Ferguson Co., New York builder, shows.

The reasons given by the companies questioned were: (a) undistributed profits tax making it inadvisable or impossible to proceed with needed improvements, (b) business uncertainty and fear that government's policy toward industry "will continue to be non-cooperative" and (c) fear of labor difficulties.

...OBITUARY...

SAMSON D. WRIGHT, president of Atlas Bolt & Screw Co., Cleveland, and its subsidiary the Atlas Car & Mfg. Co., Cleveland, died Feb. 2, aged 70 years, in a Cleveland hospital as a result of a fall two weeks earlier. Mr. Wright was known for his extensive studies of international trade relations. He was one of the original organizers of Atlas Bolt & Screw Co. in 1896.

❖ ❖ ❖

WILLIAM J. THEOBALD, production manager, United Screw & Bolt Corp., Cleveland, died Jan. 29 after a long illness, aged 64 years. After employment in the production department of National Acme Co., Cleveland, for 15 years, Mr. Theobald became production manager of the United Screw & Bolt Corp. 20 years ago.

❖ ❖ ❖

JOHN D. SHANER, secretary and senior member of the legal department of Koppers Co., Pittsburgh, died Feb. 2 at his home in Pittsburgh. He was graduated from Cornell University and had been in the employ of the Koppers Co. since 1923. He was 38 years old.

❖ ❖ ❖

CHARLES W. STONE, consulting engineer for the General Electric Co., Schenectady, N. Y., died at his home in that city on Feb. 3, aged 63 years. He had been identified with the company since 1900.

❖ ❖ ❖

JOHN W. JAMES, for many years identified in a supervisory capacity with the tin plate industry in various plants under the management of the late John Morewood Jones, died at his home in Baltimore, on Jan. 23. At the time of his death, Mr. James was identified with the operating organization of Crown Cork & Seal Co., at Baltimore.

❖ ❖ ❖

J. EMORY COOK, former manager of the Eastern Rolling Mill Co., died at his home in Baltimore, on Jan. 25, following a long illness. He had been identified with the steel industry for many years under the late John Morewood Jones, at Harrisburg, Pa., Massillon, Ohio, and for the past 18 years had resided in Baltimore, where he was connected with the Eastern Rolling Mill Co. until three years ago, when he retired because of ill-health.

❖ ❖ ❖

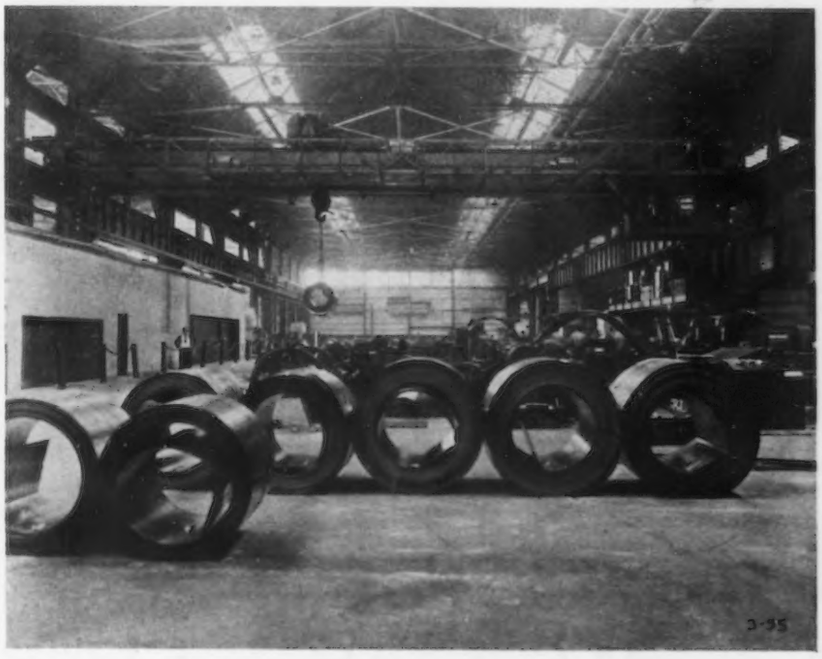
AUGUST J. BUENZLI, founder, treasurer and general manager of the Wisconsin Foundry & Machine Co., Madison, Wis., died on Jan. 31, aged 61 years. He was born in Switzerland but had resided in Madison since childhood. Before establishing the foundry concern in 1910, Mr. Buenzli was general manager of the Northern Electric Co., Madison.

❖ ❖ ❖

R. T. HODGKINS, widely known in the automotive industry, died Jan. 31 at his home in Great Neck, Long Island. Mr. Hodgkins was born in Rochester, Vt., and was a graduate of the University of Iowa. He had been identified with the automotive industry since 1914 and had been sales manager of the Studebaker Corp., vice-president of the Cleveland Tractor Co., and later vice-president of the Federal Motor Truck Co. In recent years he had been associated with the USL Battery Co.

❖ ❖ ❖

ARTHUR W. RUTTAN, SR., head of the Robinson Plating Works, Milwaukee, since 1922, died on Jan. 30, aged 59 years. He was born in New York, going to Milwaukee in boyhood.



Low-Cost Handling for 1938 and years to come

Factories equipped with Tiger cranes may be sure of low-cost handling in 1938 and for many years to come because the Tiger operates with a minimum of power and maintenance expense. Tigers are doing tough jobs in some of the newest mills and doing them at very low cost, because they are built to endure and yet operate with the least expense. *Send for Bulletin 300.*

WHITING CORPORATION **15601 Lathrop Ave., Harvey, Ill.**

WHITING

PIONEERS SINCE 1884

Steel Workers' Earnings Per Ton of Output Rise Sharply

AMOUNT of wages received by employees of the steel industry per ton of pig iron and finished steel products made for sale increased sharply during 1937, according to a study by the American Iron and Steel Institute. The study was based on data supplied by 138 companies which produce more than 90 per cent of the production for sale of iron and steel.

The increase in wages paid per ton produced was not accompanied by any increase in productivity per man.

In the fourth quarter of 1936 the companies paid out $15 in direct wages for each ton of products produced. By the third quarter of 1937, however, wage payments represented $18.60 per ton produced, largely in reflection of the fact that in March, 1937, the hourly earnings of wage earners had been raised an average of 17½ per cent to the highest level in the history of the industry.

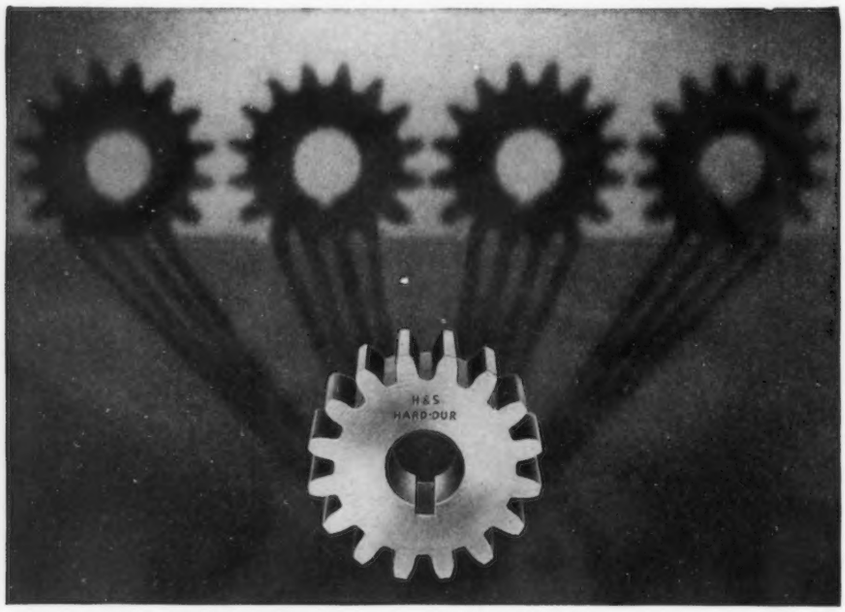
Over the same period the average output per man in each quarter showed a decline. Production for sale of pig iron and finished steel in the final quarter of 1936 was equivalent to 25.4 gross tons per wage earner employed, while output in the third quarter of 1937 amounted to 23.1 tons per man. Rate of operations of the industry was substantially the same in the two periods.

From 1934 through 1936 the amount of direct wages per ton produced remained close to $14.20 except in the last half of 1934, when greatly reduced output resulted in raising payrolls per ton to nearly $16.50. During that half-year period, the industry lost a total of $38,000,000, equivalent to about 14c. for each dollar paid out in payrolls.

In the first quarter of 1937 direct wages amounted to $15.10 per ton produced, the figure rising to $17.30 per ton in the second quarter and to $18.60 in the third period.

Average output per man varied closely with the total number of tons produced in each quarter in both 1934 and 1935, the output per man rising with an increase in total tonnage produced, and vice versa. Beginning in 1936, however, average production per man employed failed to keep pace with the greater tonnage produced.

In the first and second quarters of 1937, the tonnage of pig iron and finished steel produced for sale was 116 per cent above the tonnage produced in the first quarter of 1934. Production per man, however, in the first quarter of 1937 was only 62 per cent above the first quarter of 1934, and fell in the second quarter to 56 per cent above.



4 TIMES THE LIFE

at only 50 per cent extra . . .

"HARD-DUR" Gears preserve the tooth form. They are made only of the finest gear steels and are scientifically heat treated to obtain the maximum physical properties. They are so much stronger, harder and more wear-resistant than similar untreated gears that they are guaranteed to have four to five times the life at only 50 per cent extra in cost. "HARD-DUR" Gears handle the tough jobs on which ordinary gears fail and when used on the average job they last almost indefinitely. A trial will prove their superiority and economy.

A valuable 448 page Gear book will be sent on request.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE, CLEVELAND, OHIO, U. S. A.

Iron and Steel Maps

MAPS showing the location of all iron and steel plants in the United States have been prepared by J. H. H. Muirhead, civil engineer and cartographer, 230 West 108th Street, New York. The maps are based on data published in the Iron and Steel Works Directory of the American Iron and Steel Institute.

Quality Of Steels Has Increased More Than Price In Recent Years

PRICES of steel products over the past 15 years generally have not reflected the marked improvements in steel quality, according to a study just completed by the American Iron and Steel Institute. These improvements have brought substantial manufacturing economies to consumers of steel and have enabled them to produce new and better products.

Among the outstanding instances where the increase in quality has not been reflected in increase in price are sheet steel for making such products as automobile fenders and washing machine tubs, and alloy steel bars for making transmission gears.

The total net selling price during 1937, f.o.b. Pittsburgh, of steel sheets for making one-piece washing machine tubs was 42 per cent lower than in 1923 and 26 per cent lower than the price in 1929.

So improved is the quality of the product, however, that washing machine manufacturers can produce a tub in a single forming operation, and secure a fine finish with only one coat of enamel. By contrast, between 1923 and 1929, two forming operations, an intermediate heat treatment, and three or more coats of priming material and enamel were required to produce a similarly satisfactory product.

Automobile fender stock has been so greatly improved in the past 15 years that while one forming operation now produces the one-piece torpedo-type fender which distinguishes the recent model automobiles, it would have been practically impossible 15 years ago to produce such a fender from one piece of steel.

Furthermore, the finish of the steel today is so improved that only one priming coat and one finishing coat are needed to finish the fender, as against two priming and two finishing coats, and three polishing operations in 1923.

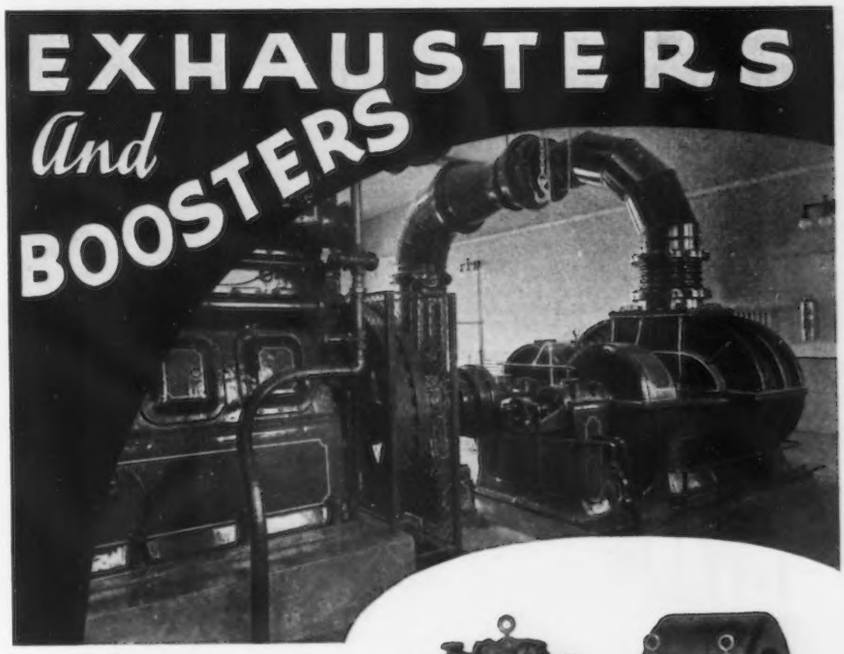
The price of sheet steel for fenders in 1937, however, was 46 per cent less than in 1923, and 29 per cent below the 1929 price.

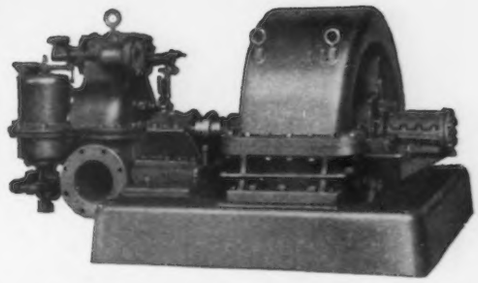
In gear steel, the improvements in quality which steel manufacturers have been able to achieve have resulted in more uniform and longer lasting gears. Gear makers find their manufacturing costs reduced as a result of the better quality steel, but the steel manufacturer's costs have increased through the necessity for more precise control of chemical composition, and much more exacting and frequent tests of the material in various stages of manufacture.

The price of a typical gear steel in 1937 nevertheless was 19 per cent below the price in 1923, and only 7 per cent above 1929.

Talking Picture Tells Story Of Wire Rope

COMPLETE processes of drawing high carbon rope wire and fabricating wire rope are shown in a new talking picture produced for the Union Wire Rope Corp., Kansas City, Mo.





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and
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Roots-Connersville Exhausters and Boosters are the modern equipment for all gas handling installations requiring pressures up to 15 lbs. gauge. Operating costs are low and any kind of drive can be used.

Since no internal lubrication or fluid seal is used the gas handled picks up neither moisture nor impurities.

Ask for complete data.

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POTTSTOWN, PA.
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ST. LOUIS
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SAN FRANCISCO

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CONNERSVILLE
BLOWER CORPORATION
CONNERSVILLE, IND.

We Employ Crystal Gazers to Foretell the Future of

CADMAN BEARING METALS

They use high powered microscopes, and how they know their crystals! They peer at a sample of every melt of Cadman Bearing Metals to be sure that it contains no large, unevenly distributed crystals . . . to be sure that the matrix is entirely composed of minute crystals, evenly distributed. Those tiny crystals foretell that the journal will rotate in a soft matrix which is self-lubricating . . . that millions of little reservoirs will maintain an unbroken oil film, even under overloads and high temperatures. For seventy-six years we've been making Cadman Bearing Metals better than others of identical composition but different crystal structure. Write today for bulletins that tell all the facts.

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2813 SMALLMAN STREET, PITTSBURGH, PA.
MASTER MAKERS OF BEARING METALS **SINCE 1860**

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PLANTS

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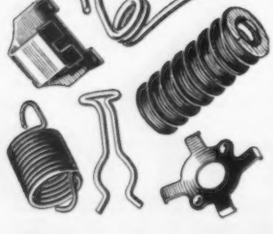
SPRING DELIVERIES



Meeting the exacting demands of leading mass-production industries—successfully—is a matter of record here. Either or both B-G-R plants are ready to plunge into your spring requirements—with engineering and design assistance—or just fast production and delivery.

Each B-G-R plant is similarly equipped with modern machines, heat treating equipment, laboratories—and what's equally important—a goodly supply of spring materials in many sizes and kinds.

It's good insurance for your assembly lines to use B-G-R service in the form of springs, stampings, wire forms

BARNES-GIBSON-RAYMOND
DETROIT PLANT — DIVISION OF ASSOCIATED SPRING CORP. — COOK PLANT
DETROIT, MICHIGAN ← **TWO PLANTS** → ANN ARBOR, MICHIGAN

. . . PERSONALS . . .

(CONTINUED FROM PAGE 73)

WILLIAM C. BRACKEN has been placed in charge of sales in the Southeastern area, with headquarters in Atlanta, by the Bunting Brass & Bronze Co., Toledo, Ohio. I. ELDRED, formerly in charge of the Kansas City office, has been made head of the Los Angeles office, at 240 West 18th Street. Effective March 15, stocks of automotive bearings and parts in Seattle will be placed in the T. F. BARSBY automotive warehouse at 1722 Broadway.

❖ ❖ ❖

PAUL DAVENPORT has been added to the Philadelphia district office of the Bailey Meter Co., Cleveland. Other cadet engineers assigned to branch office duty include: H. E. ELENIEWSKI has been placed in the Buffalo territory; O. L. GARRETSON is in the St. Louis territory; H. R. KROEGER, Denver; F. M. LECOMPTE, New York; H. R. LEUTHY, Chicago; T. O. THOMPSON, Houston; P. H. VERNOR, Milwaukee, and J. H. DENNIS, Pittsburgh.

❖ ❖ ❖

CARLTON B. OVERTON has been made head of the convention committee in connection with the 25th anniversary convention of the National Association of Waste Material Dealers, Inc., to be held in New York, March 14 to 16. CHARLES M. HASKINS, 1109 Times Building, New York, is secretary of the association.

❖ ❖ ❖

E. F. SMITH has been promoted to the post of district sales manager for Michigan, northern Ohio and eastern Pennsylvania for the Chicago Vitreous Enamel Product Co., Cicero, Ill. He has been with Chicago Vitreous in sales and service capacity for five years. He was formerly associated with the Renown Stove Co., Owosso, Mich., as enamel plant superintendent. E. C. GREENSTREET, formerly with Standard Gas Equipment Co., Baltimore, and active in the management of the Eastern Enamelers Club, has recently resigned to become affiliated with the Chicago Vitreous Enamel Product Co.

❖ ❖ ❖

JOHN H. HOLZBOG, personnel director of the Chain Belt Co., Milwaukee, was the recipient of the Milwaukee Junior Chamber of Commerce Distinguished Service Award at the January meeting of the chamber "in recognition of his services in promoting industrial safety."

C. M. WHITE, vice-president in charge of operations of Republic Steel Corp., Cleveland, will be toastmaster at the twenty-fourth annual dinner of the Traffic Club of Cleveland, Feb. 10 at Hotel Cleveland. Numerous executives of the steel and metal working industries will attend. Dinner chairman is J. W. MONTIGNEY, manager of the transportation division of the Cleveland Tractor Co. COL. LEONARD P. AYRES, Cleveland Trust Co., is scheduled to deliver the principal address.

❖ ❖ ❖

FRANK H. NAGLE, assistant secretary of the Jaeger Machine Co., Columbus, Ohio, has been elected to the board of directors of the company. The directorate was increased to 10 members through the addition of Mr. Nagle.

❖ ❖ ❖

HENRY A. ROEMER, president Sharon Steel Corp., and Pittsburgh Steel Co., is scheduled to deliver the principal address at the mid-year meeting of the Ohio Commercial Secretaries Association in Toledo, Feb. 25-26.

Navy to Take Bids On 1835 Tons of Plates

WASHINGTON—The Bureau of Supplies and Accounts will open bids on Feb. 21 for 1835 tons of plates for delivery to the Portsmouth, N. H., Norfolk, Va., Boston, Brooklyn, and Philadelphia Navy yards. Except for a small tonnage, the material is black steel plate, welding quality.

Allegheny's Brackenridge Plant Resumes Operations

PITTSBURGH—Following a conference between Allegheny Steel Co. officials and the Steel Workers' Organizing Committee last week, the Brackenridge plant of the steel company resumed operations. The plant was shut down when SWOC dues collectors interfered with employees reporting for work.

Differences were ironed out when it was agreed that the terms of the original SWOC contract would be adhered to. No picketing by dues collectors is now in progress.

Republic Steel Corp. and its subsidiaries report for the year ended Dec. 31, 1937, a net profit of $9,044,147 after interest, depreciation and taxes equal, after preferred dividends to $1.14 a share on 5,832,028 shares of common stock. This compares with a net profit of $9,568,922, or $1.74 on 4,127,264 common shares in 1936. A net loss of $243,323 was reported for the fourth quarter of 1937.

COLLECT THOSE

"Pennies FROM Heaven"

Collect the full value of unused storage space up next the ceiling.

● Service Lifters, as a simple means of "vertical materials handling", change inaccessible top-of-the-pile space to new storage room, easy, safe and cheap to reach. An inexpensive installation can reclaim space equivalent to a new warehouse. Service Electric Lifter, as shown piling cases, is versatile—will lift barrels, drums, bales—and a selective cable control stops platform invariably at a pre-selected elevation. Other Service Lifters—electric, hydraulic or hand-powered—hoist any product with savings and safety. Write for new catalog.

Service LIFTERS

SERVICE CASTER & TRUCK CO.

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Eastern Factory: 452 Somerville Avenue, Somerville (Boston), Mass.

SAFETY STEEL STAMPS

Steel and design protected by U. S. patents.

No Mushrooming • *No Spalling*

OUTSTANDING SERVICE IS ASSURED WITH SAFETY

M. E. CUNNINGHAM COMPANY

101 E. Carson St. Pittsburgh, Penna.

The Housing Program Versus Rent and Population Trends

"THE assumed 'normal' of 2.5 to 3.0 billion dollars of housing annually is not a normal at all but simply the abnormal peak which comes but once in the lifetime of a nation," according to a study released today by the business economists, Allen W. Rucker and N. W. Pickering, under the title of "The Housing Program versus Rent and Population Trends." The study is published by the Farrel-Birmingham Co., Inc., Ansonia, Conn., for distribution to industrial executives.

In the opinion of the authors, the Federal Housing Program ignores three fundamental factors: (1) the rise of building costs relative to rents as well as absolute; (2) the rapidly declining birth rate of the nation and (3) the distribution of child population in areas least able to afford new homes.

"The Housing Program depends for its success upon stimulating building where fertility is highest and productivity is lowest; it revolves around a farcical attempt to undo in four years what has required natural forces four centuries to accomplish.

The Northeastern States along the Atlantic Seaboard have 29.66 per cent of the nation's children and 42.93 per cent of the nation's income; the Southeastern States have 24.41 per cent of the nation's children and but 10.01 per cent of the national income. Any attempt, through a Federal-sponsored Housing Program, to distribute the national income upon a basis of fertility instead of productivity is fraught with the gravest consequences."

About pickling solutions—would you like to know:

What size Duriron Steam Jets, it takes to heat any given volume, at steam pressures up to 85 lbs/sq/in. —and probable steam consumption?

Just run your finger along the Chart on Steam Jets in the new Duriron Bulletin No. 1801-A—and there you are!

Besides data on Steam Jets, steam consumption, etc., it has information on Duriron Siphons, Tank Outlets, and Spray Nozzles.

(You use Duriron Siphons to empty your lined tanks when you don't want to cut through for a bottom outlet.)

This bulletin—fresh off the press —is yours for the asking. We have a copy to mail to you the same day we get your request.

THE DURIRON COMPANY, Inc.

438 N. Findlay St. Dayton, Ohio

December Steel Wages Averaged 82.3c.

STEEL payrolls in 1937 were highest on record at $967,000,000 or 16 per cent above 1929, although 1937 ingot production was about 9 per cent under the 1929 peak, the American Iron and Steel Institute reports. Other institute data show:

An average of 508,000 employees (551,000 in November) earned an average of 82.3c. hourly in December, working 23.4 hr. a week (against 82.1c. for 27.6 hr. a week in November).

December ingot output was 70 per cent under August, 1937, and the December payroll was $52,062,000 or 44 per cent under August, when $92,663,000 was paid to 603,000.

Armco Payrolls in 1937 Upward of $25,000,000

MIDDLETOWN, Ohio — Wages paid by the American Rolling Mill Co. in 1937 increased 14 per cent over 1936, despite the sharp decline in production and employment during the last quarter that affected the entire industry.

The company paid out approximately $3,000,000 more to its employees in 1937 than in 1936. Payrolls last year totaled more than $25,000,000 while in 1936 total payrolls amounted to more than $22,000,000.

Navy Buys Tin from American Metal Co.

WASHINGTON—The American Metal Co., New York, has been awarded a Navy Department contract for 201,600 lb. of grade A tin at 40.45c. per lb. Delivery is to be made at Naval Clothing Depot, New York.

Wage Agreement Between SWOC and U. S. Steel Expected This Week

ALL steel companies which followed the United States Steel Corp. last year in signing wage agreements with the SWOC are expected to renew their agreements with the steel union this week and next.

Approximately half of the contracts held with steel producing and processing companies expire Feb. 28 while the balance end at other periods during the coming year.

Conferences between the SWOC and the United States Steel Corp. were started this week in New York following a meeting of 35 SWOC lodge presidents.

Benjamin F. Fairless, president of United States Steel, Thomas Moses, vice-president, and J. L. Perry, president of Carnegie-Illinois Steel Corp., represented the steel corporation at the negotiations which were held starting Monday.

Philip Murray, chairman of the SWOC, was flanked by Van A. Bittner, Western Regional Director of the SWOC; Clinton S. Golden, Pittsburgh regional SWOC director, and Lee Pressman, SWOC attorney at the wage conference.

Steel Exporters Discuss Quotas On Sheets and Strip

CONVERSATION between representatives of the International Steel Cartel, who arrived from Europe last week, and members of the Steel Export Association of America have been held during the past several days in an effort to arrive at an agreement covering export sales of sheets and strip steel.

Those who represent the European cartel are: Hector Dieudonne, director general of the International Steel Cartel, from Paris; the Earl of Dudley, chairman of the British Iron and Steel Federation; I. F. L. Elliot, managing director of the British federation, and Geoffrey Spencer Summers, a director of the federation.

Meetings have been held in the board room of the Guaranty Trust Co., New York.

The Steel Export Association of America was organized in 1928 under the Webb-Pomerene Act by the United States Steel Corp. and the Bethlehem Steel Co. Other companies that have since joined are the Republic Steel Corp., Jones & Laughlin Steel Corp., Weirton Steel Co., Youngstown Sheet & Tube Co., Wheeling Steel Corp., McKeesport Tin Plate Co. and Spang, Chalfant & Co. Up to this time the American association has confined its activities to pipe and tin plate.

Discussions held here thus far have had to do largely with the fixing of quotas for the various mills concerned. It is understood that difficulty has been encountered in arriving at a formula that will give all of the mills the share to which they believe they are entitled.

The European visitors have booked return passage on the *Bremen*, which sails from New York at midnight Friday of this week, by which time it is expected that an arrangement satisfactory to both European and American mills will have been concluded.

PAGE HI-TENSILE "C"

for Speed and Profit

● Jobs that require welding in all positions—overhead, vertical and horizontal—jobs that must stand rigid inspection and meet high strength requirements—jobs that must be put through in limited time—are handled to best advantage with Page Hi-Tensile "C" Electrodes.

Hi-Tensile "C" has speeded up many jobs, reduced many cost records. It is a quiet, steady electrode that causes very little spatter and slag loss. Used with greatest convenience and efficiency when work must be done in close quarters. Adaptable to production, maintenance and repair work.

Your local Page distributor will show you how Page Hi-Tensile "C" and other Page Electrodes speed up work and increase profits.

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AMERICAN CHAIN & CABLE COMPANY, Inc.
MONESSEN, PENNSYLVANIA

In Business for Your Safety

ACCO

PAGE *Welding* WIRE

PARTS LIKE THESE
SMALL STAMPINGS—WIRE FORMS
SPRINGS—VARIOUS TYPES
WASHERS—PLAIN, SPRING, SPECIAL
have solved countless design and manufacturing problems. Let us know what yours is. Design consultant services at your disposal. It will pay you to inquire.
M. D. HUBBARD, PRES.
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J. A. HUBBARD, SECY.
M. D. Hubbard Spring Company
750 CENTRAL AVE., PONTIAC, MICH.

STANDARD
S.A.E. ALLOY STEELS
IN STOCK

For those who prefer standard numbered steels we have

2315	3130	4340	6150
2320	3135	4345	X4130(Aircraft)
4615	3140	4350	4140
4620	3145	6145	4150

For those who wish to take advantage of constant metallurgical improvement and development long before they are incorporated in S.A.E. standards, or where close selection of material for analysis, grain size, control and quality is desired, we offer

ALLOY HY-TEN GRADES

THE HY-TEN OF TODAY IS THE STANDARD STEEL OF TOMORROW

A"1X	B"2	B"4	B"43
A"15	B"3X	B"5	"M" Temper

Rounds Squares Flats **BARS and FORGINGS** Hexagons Octagons

Warehouses CAMBRIDGE CLEVELAND CHICAGO

WHEELOCK, LOVEJOY & CO., INC.
Send for Data Sheets

Warehouses DETROIT NEWARK BUFFALO

REINFORCING STEEL

. . . Awards of 3765 tons—2850 tons in new projects.

AWARDS

New York, 700 tons, Tallmans Island sewage plant, to Carroll-McCreary Co., Brooklyn.

New York, 150 tons, ramps, West Side elevated highway, to Carroll-McCreary Co., Brooklyn.

Braddock, Pa., 100 tons, school, to Lind Co., Pittsburgh.

Scotland, Pa., 130 tons, Orphans Home, to Concrete Steel Co., New York.

Cheyney, Pa., 130 tons, Teacher's Training School, to Concrete Steel Co., New York.

Mansfield, Pa., 220 tons, Teachers College, to Whitaker Construction Co., Canton, Ohio.

Detroit, 370 tons, sewage disposal system, sludge digestion tank, elutriation tanks, gas holder, to Ceco Steel Products, Omaha, Neb.

Indianapolis, 130 tons, Indiana Women's Prison, to Inland Steel Co., Chicago.

Muncie, Ind., 100 tons, bridge, to Inland Steel Co., Chicago.

Chicago, 170 tons, commercial testing laboratory, to Inland Steel Co., Ryerson & Sons, Chicago.

Madison, Wis., 100 tons, Stephen Lee apartment building, to Bethlehem Steel Co., Bethlehem, Pa.

Rutledge, Tex., 200 tons, Colorado River project, to Tennessee Coal, Iron, & Railroad Co., Birmingham.

National City, Cal., 100 tons, Sweetwater River highway bridge, to Soule Steel Co., Los Angeles.

Los Gatos, Cal., 155 tons, highway work, to San Jose Steel Co., San Jose, Cal.

Santa Monica, Cal., 100 tons, Corral, Solstice, and Escondido State highway bridges, to Trojan Steel Co., Los Angeles.

San Francisco, 288 tons, United States Treasury Procurement Office, to Soule Steel Co., San Francisco.

Cody, Wyo., 350 tons, Bureau of Reclamation (Invitation A-48101-A), to Carnegie-Illinois Steel Corp., Pittsburgh.

Panama Canal Zone, 250 tons, to Capitol Steel Corp., Brooklyn.

NEW REINFORCING BAR PROJECTS

Cambridge, Mass., 280 tons, Harvard University administration building, previously reported as 125 tons.

New York, 150 tons, Treasury Procurement Department, for WPA projects, W. Ames & Co., Jersey City, low bidder.

Brooklyn, 190 tons, Meeker Avenue bridge approaches; bids close Feb. 15, Department of Public Works, New York.

Norfolk, Va., 265 tons, Navy Yard requisition, Hall-Hodges, Inc., Richmond, Va., low bidder.

Chicago, unstated tonnage, Sears, Roebuck & Co. retail store, Cicero and Irving Streets

State of Illinois, 150 tons, highway work; bids in.

Blaisdell, Ariz., 1136 tons, Gila project (Invitation 24-605-A); bids opened.

Rutledge, Tex., 155 tons, Colorado River project; bids opened.

Lewiston, Idaho-Clarkston, Wash., 692 tons, Snake River highway bridge; bids March 1.

....PIPE LINES....

Shell Pipe Line Co., Shell Building, St. Louis, a subsidiary of Shell Petroleum Corp., plans 4-in. welded steel pipe line from Jennings-Evangeline oil field, La., to connection with main pipe line at Roanoke, La., oil area, about 10 miles, extending to terminal at Lake Charles, La., for crude oil transmission. Cost about $85,000 with booster pumping station.

United States Engineer Office, Vicksburg, Miss., closes bids Feb. 12 for 2800 ft. of galvanized wrought steel pipe, 1500 ft. of wrought steel pipe, pipe caps, elbows, etc. (Circular 192).

Oklahoma Pipe Line Co., National Bank of Tulsa Building, Tulsa, Okla., will build new 8-in. Lindewelded steel pipe line from Ardmore, Okla., to connection with pipe line north of that place, about 21 miles, for oil transmission. Cost over $150,000 with booster pumping station and other operating facilities.

S. O. White, Sayre, Okla., is at head of project to build a steel pipe line system for natural gas distribution at Geary, Okla. Cost about $35,000 with control station and operating facilities.

Bureau of Reclamation, Denver, asks bids until Feb. 17 for steel pipe, fittings and valves for units N-5 and N-6 at Boulder power plant (Specifications 1030-D).

Los Angeles plans new 10 or 12-in. steel pipe line from new water well in Freeman Avenue to connection with main supply line. Cast iron pipe also is under consideration. D. H. Griffith is city water superintendent.

Michigan-Toledo Pipe Line Co., Cedar Point Road, Toledo, Ohio, plans new 8-in. welded steel pipe line between bulk terminals and pumping stations at Mount Pleasant and Crystal, Mich., forming a loop with present 6-in. line between these two points, for crude oil transmission. Work is scheduled to begin early in spring.

Greensboro Gas Co., Greensboro, Pa., plans welded steel pipe lines for natural gas transmission in connection with development of gas wells in South Union Township, Fayette County, Pa. Steel pipe line gathering system will be installed in field.

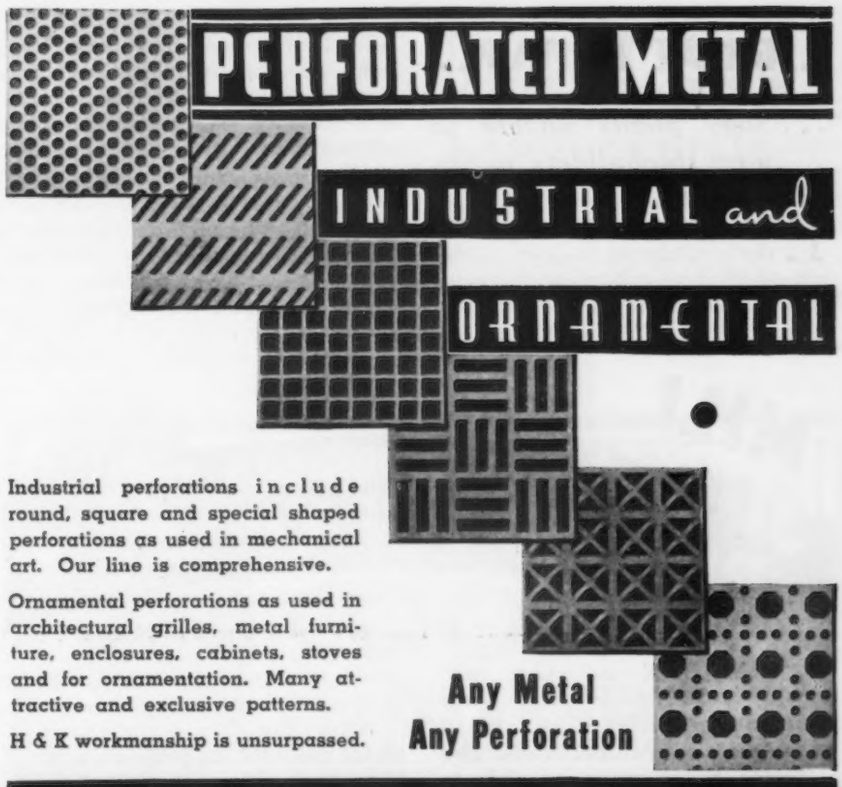
Havre, Mont., has let contract to J. L. McLaughlin, Ford Building, Great Falls, Mont., for a steel pipe line system for natural gas distribution in different parts of municipality, with control station and operating facilities, at $144,652. Contract previously awarded to same contractor several months ago at $117,173 was cancelled. C. O. Moore is gas engineer; G. E. Atkinson is city engineer.

Berkeley, Cal., has opened bids on 6000 ft. of 8 to 16-in. welded steel pipe.

General Purchasing Officer, Panama Canal, Washington, asks bids Feb. 11 on 4000 ft. of welded steel pipe and 99,000 ft. of galvanized steel pipe.

George Scherr Co., 128 Lafayette Street, New York, has taken over the exclusive sale of Leitz optical precision measuring instruments. Various styles and sizes of toolmakers' microscopes, large and small projection apparatus, microscopes for surface inspection and also some types for metallurgical purposes are included in the line, units of which are on exhibit at the Scherr company's offices.

H. G. Irwin Lumber Co. of Erie, Pa., shippers of Silveroc and Durock hammer boards, has opened a new factory in Erie. This factory is equipped with the most modern equipment for making hammer boards for the drop-forging trade. The building is of fire-resisting construction.



Industrial perforations include round, square and special shaped perforations as used in mechanical art. Our line is comprehensive.

Ornamental perforations as used in architectural grilles, metal furniture, enclosures, cabinets, stoves and for ornamentation. Many attractive and exclusive patterns.

H & K workmanship is unsurpassed.

Any Metal
Any Perforation

The Harrington & King PERFORATING Co.

5657 FILLMORE STREET—CHICAGO, ILL. New York Office, 114 Liberty Street

MAINTENANCE?

WELL, HARDLY EVER

Hannifin "Packless" Air Control Valves have simplest, disc-type design. There is no packing, and no leakage or packing maintenance troubles. Disc and seat are ground and lapped; simply relapping at long intervals restores original efficiency.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, electric, and special types. Write for Valve Bulletin 34-A.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Ave., Chicago, Illinois
ENGINEERS • DESIGNERS
MANUFACTURERS
Pneumatic and Hydraulic Production Tool Equipment

HANNIFIN "Packless" AIR CONTROL VALVES

..GREAT BRITAIN..

. . . *Steel plants unable to meet shipbuilders' needs.*

LONDON, Feb. 8. (*By Cable*).—The pig iron market is quiet and, as consumers are still using imported iron bought under old contracts, two Cleveland furnaces have been blown out. Tees pig iron shipments during January amounted to 1500 tons, the lowest since the general strike in 1926.

Steel makers are heavily engaged. The temporary strike at Dorman Long Britannia Works last week lost a week's output of nearly 4000 tons. Shipbuilders have presented representations urging speeding up of steel deliveries which are only 60 per cent of requirements.

There are ample supplies of semi-finished steel as poor sheet trade has released quantities of sheet bars, and no more foreign semi-finished steel is now being purchased.

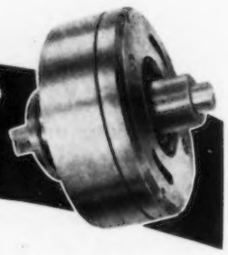
The Continental iron and steel market is quiet. The recent price reduction has not induced fresh buying. The makers' order books are still depleted, and normal delivery delays are now only three or four weeks.

The Tube Cartel left export prices generally unchanged but revised galvanized tubes in accordance with cheaper zinc. The Hoop and Strip Cartel was prolonged a further period from June 30. The International Tin Plate Cartel left minimum prices unchanged.

The demand for tin plate is still quiet, but now that the price decision is known, a revival of business is expected.

Black sheets are quiet with export prices general. Exports to South Africa and Rhodesia are now on a basis of £14. Galvanized sheets are quiet except for an inquiry from Australia by special permit which is likely to total 35,000 tons. Export prices are general. Exports to South Africa and Rhodesia now are all on a basis of £16 15s. f.o.b.

MILL JOGGING demands a RUGGED CLUTCH



GIANTS of the steel mill operate hour after hour smoothly, perfectly—as long as the motor clutch functions. The motor clutch must be able to withstand heat, dirt, dust. It must jog in and out thousands of times a day. It must give positive, lightning fast, engagements and disengagements for perfect screwdown, for it is in a position where a shut-down could mean an operating loss of thousands of dollars.

Work like this requires a clutch built for the job—a Dings Mill Type Magnetic Clutch. Such leading steel mills as Republic Steel Corp., Jones & Laughlin Steel Corp., Ford Motor Co., Carnegie-Illinois Steel Corp., Otis Steel Co., and Youngstown Sheet & Tube Co., are examples of typical Dings users.

Dings High Intensity MAGNETIC CLUTCHES

DINGS MAGNETIC SEPARATOR CO.
727 Smith Street, Milwaukee, Wisc.

Drilling and Tapping Costs
GRAND RAPIDS GRINDERS
Taps and drills cut faster when they are kept sharp —they last longer when they are correctly ground. Grand Rapids Grinders do the grinding in half the usual time and with a precision that eliminates tool breakage. They can save you money. We make many types and sizes in addition to the No. 10-B Combination Tap and Drill Grinder shown here.
Write for bulletin.
MEYER & LIVINGSTON CO.

Niagara Bridge Total Loss; No Scrap Salvage

BUFFALO — While 2300 tons of scrap steel of the collapsed Fallsview Bridge over the Niagara River at Niagara Falls lay sprawled in the rapidly melting ice jam in the gorge, two separate plans for a new bridge were going forward.

All hope of salvaging the old steel abandoned, dynamiters Saturday and Sunday, acting under the instructions of the owners of the bridge, the International Railway Co., placed charges which split the structure into several sections so that it will sink to the bottom of the river when the ice goes out.

The International Railway Co. has announced plans for a new bridge, and the Niagara Falls Observation Bridge Co. of Ontario, a group of private stockholders representing the Ontario government, expects to build a public bridge in cooperation with the state of New York. Ontario government legal authorities say the International Railway Co. charter is no longer valid.

Foundry Equipment Makers Meet

CLEVELAND — The advantages of making full use of Government services were outlined at the annual meeting of the Foundry Equipment Manufacturers Association here on Tuesday, Feb. 8, by Lewis Lind, chief of the Machinery Division, Bureau of Foreign and Domestic Commerce. Equipment men from many industrial centers attended the one-day session.

"Recently we would have been able to save a manufacturer a $10,000 penalty on an equipment order, if he had told us before the specified delivery date of the difficulties in fabrication he was experiencing," said Mr. Lind. "We have furnished information on the factors to be considered in forming a patent pool. We have made surveys for the machinery organization which amounted to a regional market analysis. On the export side, we gather and evaluate news and figures from all over the world for American firms."

A report issued by the Department of Commerce and released at the meeting here showed export sales of American foundry equipment in 1937 totaled $1,507,103, compared with $2,139,000 in 1936. Canada was again the leading market, with purchases totaling $556,000, followed by the United Kingdom, with purchases totaling $220,000 last year.

Dan M. Avey, secretary-treasurer, American Foundrymen's Association, Inc., outlined progress in safety and hygiene codes for foundry operations and the work which the association is doing in preparing basic engineering codes.

Japan To Spend $5,800,000 For U. S. Rolling Mills

TOKYO (*By Mail*). — With the foundation work for two sets of 1000-ton blast furnaces at the Hirohata Iron Works of the Japan Iron Mfg. Co. completed, the company is now preparing to invite bids for American rolling machinery to be used in the production of 400,000 tons of cold finished plates annually. The orders involve a sum of approximately 20,000,000 yen ($5,800,000). Domestic production of cold rolled plates at present amounts to no more than 22,000 tons, including 12,000 tons produced by the Yawata Steel Works and 10,000 tons by the Kawasaki Iron Works. The bulk of the domestic demand is imported from the United States. Owing to the development of the native motor car industry and the Government policy to replace wooden railway coaches with all-steel bodies, the market for cold rolled sheets has considerably broadened of late.

Two Sheet Mill Units Ordered from Continental

CONTINENTAL ROLL & STEEL FOUNDRY CO., Pittsburgh, has received orders for two complete three-high mechanized sheet mill units. One of the units, to be used as a finishing sheet mill, will go to Continental Steel Co., Kokomo, Ind., and the other, a sheet break down mill, is for Superior Sheet Steel Co., Louisville, Ohio.

Model "TL" Gusher Pump with Polyphase Motor.

"GUSHER" COOLANT PUMPS

produce the additional steady flow of coolant that is needed in today's production methods. You don't have to prime Gusher Pumps, nor is there any packing to renew or adjust. Please write us for supplement catalog.

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PUNCHES • SHEARS • SPACING TABLES

THOMAS
MACHINE MANUFACTURING COMPANY
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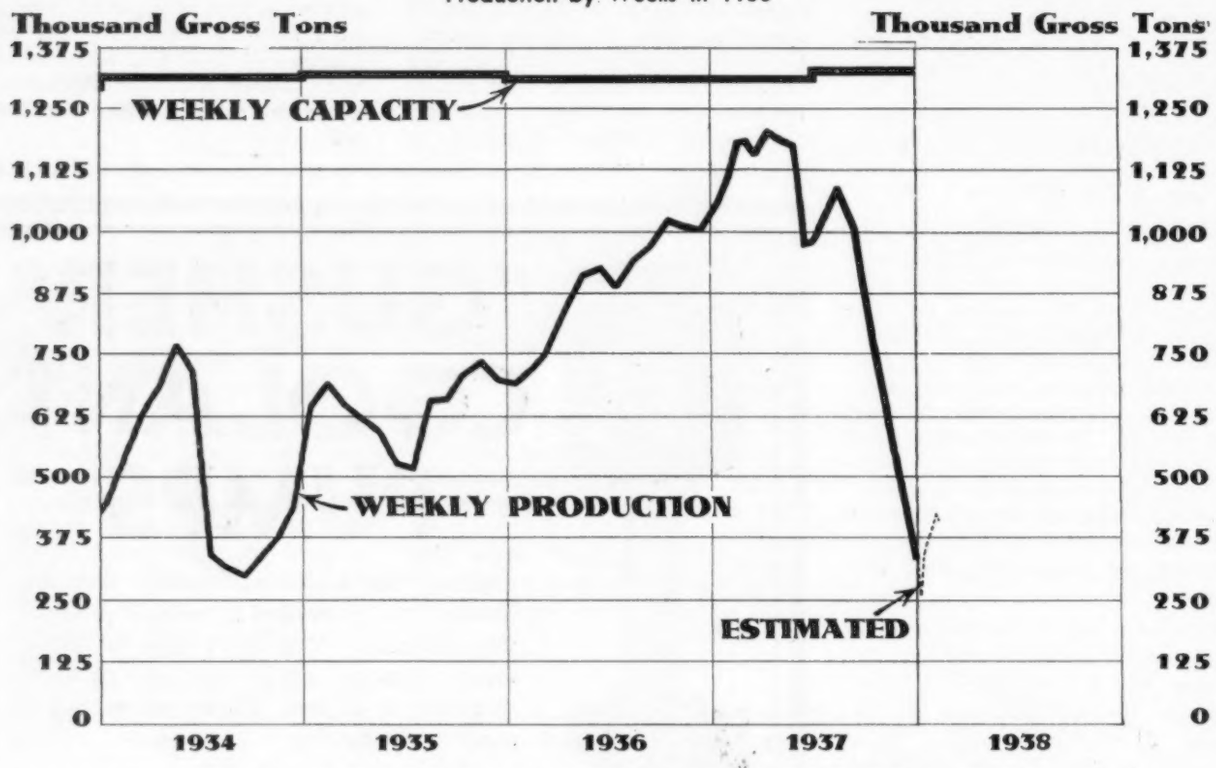
PITTSBURGH, PA.

BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1938



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	31.0	30.0
Chicago	24.0	25.0
Valleys	26.0	26.0
Philadelphia	29.0	29.0
Cleveland	27.0	26.0
Buffalo	18.0	14.0
Wheeling	60.0	60.0
Southern	42.5	46.0
Ohio River	48.0	57.0
Western	40.0	40.0
St. Louis	25.0	27.0
Detroit	42.5	42.5
Eastern	50.0	10.0
Aggregate	31.0	*31.0

* Revised.

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Feb. 8, 1938	Feb. 1, 1938	Jan. 11, 1938	Feb. 9, 1937	1938	1937
Fabricated structural steel awards	5,950	18,400	11,350	26,630	75,150	166,665
Fabricated plate awards	875	9,075	1,040	7,575	15,190	23,590
Steel sheet piling awards	580	0	0	1,580	2,395	10,530
Reinforcing bar awards	3,765	6,955	12,155	4,385	27,280	18,635
Total Lettings of Construction Steel	11,170	34,430	24,545	40,170	120,015	219,420

. . . .SUMMARY OF THE WEEK. . . .

▼ ▼ ▼

. . . Industry awaits effect of wage parley on business.

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. . . Ingot rate holds at 31 per cent; scrap prices weaken.

° ° °

. . . Automobile sales gain but assemblies continue light.

EFFORTS by steel producers and consumers to appraise the effect on business of this week's negotiations on a wage contract by the United States Steel Corp. and the SWOC so far have not been fruitful. While some orders held up by price and wage uncertainty of recent weeks are expected to materialize shortly, the industry is already looking for other developments to restore confidence.

Steel companies following the steel corporation's lead a year ago in making signed agreements covering wages and other conditions of work, are expected to do likewise this year, with some of the larger independent producers continuing to stand firm against such agreements.

Just before going to press, The Iron Age learned that an agreement was being made between the United States Steel Corp. and SWOC whereby neither steel prices nor wages are to be cut at this time. Future decisions on such issues will depend on the course of business, The Iron Age was told.

Overshadowed by interest in the wage negotiations are other developments indicating that the period of hesitancy in business is not over. Steel ingot production for the country stands at 31 per cent, unchanged from last week. Some districts report slight improvement, with Pittsburgh up fractionally to 31 per cent, the Cleveland-Lorain area a point higher at 27 per cent, and Chicago a point lower at 24 per cent. Other important centers, such as Youngstown and Wheeling-Weirton, are unchanged. January ingot production of 1,732,266 tons was the lowest for any January in 20 years, excepting 1932 and 1933.

Reflecting continued low melting rates, scrap prices, after holding for five weeks, have turned down with No. 1 heavy melting steel off 25c. at Chicago where other grades dropped from 50c. to $1 a ton. With weakness at other centers, except in export classifications at Philadelphia, THE IRON AGE composite price (an average of Pittsburgh, Chicago and Philadelphia prices) was lowered by 8c. to $13.92.

THE steel industry finds its principal outlets still operating on recent low production schedules.

Automobile manufacturers report improved sales, particularly in used cars, providing a basis for hope that the used car jam will be broken and that assembly schedules requiring increased amounts of steel are not far off. A slash of $100 by Packard on all six-cylinder models has aroused speculation as to maintenance of automobile prices generally, but reports from Detroit indicate no unanimity of opinion for widespread reductions.

Purchasing by the railroads remains light, pending the Interstate Commerce Commission decision on a freight rate advance. The New Haven plans a $1,253,000 car modernization program and contemplates purchase of about 7600 tons of rails. Steel for six locomotives to be built for the Milwaukee Road by American Locomotive Co. will be bought shortly. Bangor & Aroostook is inquiring for 500 box cars, 100 70-ton hoppers and 50 rack cars.

Structural steel lettings for the week, including an award of 1285 tons for American Rolling Mill Co. expansion at Middletown, Ohio, are the lowest since mid-October, with new projects of 11,700 tons covering 5000 tons for a Pittsburgh bridge and 1020 tons for a span between Lewiston, Idaho, and Clarkston, Wash. The Bureau of Reclamation is inquiring for 1400 tons of reinforcing bars, with reinforcing awards this week totaling 3675 tons.

Japan is reported in the market for 50,000 tons of pig iron, expected to be placed mostly in the South for March-April delivery. Meanwhile the January daily average of pig iron production in the United States was reported 4.1 per cent under December. January's total production was 1.429 085 tons compared with 1,490,324 tons in December.

In New York this week attempts to reach agreements covering export sales of sheets and strip by fixing of quotas were being made by representatives of the International Steel Cartel and the Steel Export Association of America.

. . . PITTSBURGH . . .

. . . District ingot production gains slightly to 31%.

° ° °

. . . Bookings increase slowly but total continues small.

° ° °

. . . Wage uncertainty still an obstacle to improved demand.

PITTSBURGH, Feb. 8.—Steel ingot output in the Pittsburgh district this week is up fractionally to 31 per cent, while the Wheeling-Weirton rate continues unchanged at 60 per cent of capacity. Producers are still somewhat handicapped in setting up steel making schedules in view of the uneven volume of incoming business. Aggregate steel booking increased slightly during the past week. This was brought about by an increase in the number of individual orders and by slightly augmented tonnages. New business, however, continues unimpressive and represents absolute necessities, but there is increasing evidence that depletion of inventories is going forward rapidly. It is significant that ultimate consumption has dropped perceptibly during the past few months.

No real insight as to the probable trend of steel business can be obtained until after wage negotiations have been concluded and price policies for the second quarter disclosed.

Tin plate specifications during the past week were in slightly better volume and operations have been lifted from 35 to 40 per cent of capacity. Sales of wire products continue to increase, but jobbers are still exercising caution in their commitments.

Mill prices on all steel products are holding firm and variations which do occur are restricted to secondary markets.

Pig Iron

The number of individual orders has increased slightly during the past week but tonnages involved are still small. No particular improvement in buying is expected until present wage negotiations are out of the way. Results of the latter will probably clarify price trends.

Semi-Finished Steel

Total volume of orders has changed but little from a week ago. Buying is still restricted to necessary requirements. Demand for wire rods from non-integrated makers has improved in line with increased sales of merchant wire products.

Bars

Little change if any has occurred in demand for hot rolled bars. Jobbers and farm implement makers continue to be the main support of an otherwise dull market. However, diversification of orders has increased slightly during the past week suggesting a further reduction of inventories. Orders are for small lots and prompt delivery.

Cold Finished Bars

The volume of new business is unchanged from a week ago. Jobber buying is spotty but accounts for a fair portion of total specifications. Automotive purchases continue virtually absent and in many cases temporary suspensions have been placed on shipments.

Reinforcing Bars

Awards during the past week were fairly numerous but practically all projects called for small tonnages. Inquiries are lighter than for some time but include a Bureau of Reclamation project requiring approximately 1400 tons.

Plates and Shapes

Structural plate and shape specifications are holding up fairly well but awards and inquiries are not as numerous as a few weeks ago. A bridge at Pittsburgh will require 5000 tons of material. An annealing and shipping building, requiring 1300 tons of plates and shapes, at Middletown, Ohio, for American Rolling Mill Co. will be fabricated by Joseph T. Ryerson & Son, Inc., Chicago.

Tin Plate

The volume of tin plate specifications during the past week showed some improvement. A portion of the increase was for packers' specifications while some renewed activity is reported from some general line can manufacturers. Tin plate operations are up this week and may be estimated at 35 to 40 per cent.

Wire

Jobber buying of merchant wire products continues to increase. Some customers not heard from for several months have placed orders recently. Tonnages, however, are not as large as was anticipated but this condition is undoubtedly due to extreme caution pending the outcome of wage negotiations. Bookings of manufacturers' wire have shown only slight increases during the past week. Mill prices of wire products are firm despite variations in secondary markets.

Sheets and Strip

Virtually no improvement in sheet demand has materialized during the past week. Miscellaneous buying is spotty and little or no automotive purchases are expected during this month. One mill has adopted a policy of reclaiming secondary sheet mill products heretofore sold as coil ends, waste wasters, etc. Demand for hot and cold rolled strip shows little or no change from recent activity with all buying on a strictly hand-to-mouth basis.

Tubular Goods

Aggregate tubular goods sales are unchanged in volume from a week ago. Producers continue to build up depleted mill and warehouse stocks. Production of standard pipe is slightly better reflecting low jobber inventories rather than an improvement in ultimate consumption.

Coal and Coke

Demand for beehive foundry coke remains stagnant. Occasional carload lots are purchased but most of the plants which started up over a year ago when a tight coke situation existed, have shut down.

. . SAN FRANCISCO . .

. . . Canal award goes to Bethlehem Steel Co.

SAN FRANCISCO, Feb. 8.—A dormant structural steel market has been partially offset here by fair reinforcing bar activity. The Bureau of Reclamation is again buying for the Gila and All-American Canal projects after a lull reportedly due to labor difficulties. Bethlehem Steel Co.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Feb. 8, 1938	Feb. 1, 1938	Jan. 11, 1938	Feb. 9, 1937
Rails, heavy, at mill	$42.50	$42.50	$42.50	$39.00
Light rails, Pittsburgh	43.00	43.00	43.00	38.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	34.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	34.00
Slabs, Pittsburgh	37.00	37.00	37.00	34.00
Forging billets, Pittsburgh	43.00	43.00	43.00	40.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	2.20
Bars, Chicago	2.50	2.50	2.50	2.25
Bars, Cleveland	2.50	2.50	2.50	2.25
Bars, New York	2.79	2.79	2.79	2.55
Plates, Pittsburgh	2.25	2.25	2.25	2.05
Plates, Chicago	2.30	2.30	2.30	2.10
Plates, New York	2.54	2.54	2.54	2.33
Structural shapes, Pittsburgh	2.25	2.25	2.25	2.05
Structural shapes, Chicago	2.30	2.30	2.30	2.10
Structural shapes, New York	2.5125	2.5125	2.5125	2.3025
Cold-finished bars, Pittsburgh	2.90	2.90	2.90	2.55
Hot-rolled strips, Pittsburgh	2.40	2.40	2.40	2.15
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.85
Hot-rolled annealed sheets, No. 24, Pittsburgh	3.15	3.15	3.15	2.80
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.90
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.40
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.50
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	2.15
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	2.25
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	3.25
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.35
Wire nails, Pittsburgh	2.75	2.75	2.75	2.25
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.30
Plain wire, Pittsburgh	2.90	2.90	2.90	2.60
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.65
Barbed wire, galv., P'gh	3.40	3.40	3.40	2.75
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.80
Tin plate, 100-lb. box, P'gh	$5.35	$5.35	$5.35	$4.85

Pig Iron

Per Gross Ton:	Feb. 8, 1938	Feb. 1, 1938	Jan. 11, 1938	Feb. 9, 1937
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$22.76
No. 2, Valley furnace	24.00	24.00	24.00	21.00
No. 2, Southern Cin'ti	23.89	23.89	23.89	20.69
No. 2, Birmingham†	20.38	20.38	20.38	17.38
No. 2, foundry, Chicago*	24.00	24.00	24.00	21.00
Basic, del'd eastern Pa.	25.26	25.26	25.26	22.26
Basic, Valley furnace	23.50	23.50	23.50	20.50
Malleable, Chicago*	24.00	24.00	24.00	21.00
Malleable, Valley	24.00	24.00	24.00	21.00
L. S. charcoal, Chicago	30.24	30.24	30.24	26.54
Ferromanganese, seab'd, carlots	102.50	102.50	102.50	80.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$14.25	$14.25	$14.25	$19.50
Heavy melting steel, Phila.	14.75	14.75	14.75	18.50
Heavy melting steel, Ch'go	*12.75*	13.00	13.00	19.00
Carwheels, Chicago	*15.00*	15.50	15.50	18.50
Carwheels, Philadelphia	*15.25*	15.75	16.25	18.50
No. 1 cast, Pittsburgh	16.25	16.25	16.25	17.75
No. 1 cast, Philadelphia	*15.75*	16.25	16.75	19.25
No. 1 cast, Ch'go (net ton)	*12.25*	12.50	12.50	16.00
No. 1 RR. wrot., Phila.	*15.25*	15.75	16.25	17.25
No. 1 RR. wrot., Ch'go (net)	*10.25*	10.75	10.75	16.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$4.00
Foundry coke, prompt	5.00	5.00	5.00	4.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Jan. 3 Cents	Cents
Electrolytic copper, Conn.	10.00	10.00	10.875	13.00
Lake copper, New York	10.125	10.125	11.125	13.12½
Tin (Straits), New York	*40.50*	40.875	42.75	50.25
Zinc, East St. Louis	*4.75*	5.00	5.00	6.40
Zinc, New York	*5.10*	5.35	5.35	6.75
Lead, St. Louis	*4.60*	4.75	4.75	5.85
Lead, New York	*4.75*	4.90	4.90	6.00
Antimony (Asiatic), N. Y.	15.625	15.625	15.625	14.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Feb. 8, 1938	2.605c. a Lb.	$23.25 a Gross Ton	$13.92 a Gross Ton
One week ago	2.605c.	23.25	14.00
One month ago	2.605c.	23.25	14.00
One year ago	2.330c.	20.25	19.00

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1937	2.605c., Mar. 9	2.330c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	$21.92, Mar. 30	$12.92, Nov. 16
1936	2.330c., Dec. 28	2.084c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 23
1934	2.199c., Apr. 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., Apr. 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., Apr. 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 17	13.08, Nov. 22

took a 1040-ton award for the latter project.

Western Pipe & Steel Co., San Francisco, winner of the Grand Coulee 8273-ton penstock award, this week will select a site for the penstock fabrication plant near the dam site from the two approved by the Bureau of Reclamation. George Williams will be general manager of the plant.

A highway bridge over the Snake River between Clarkston, Wash., and Lewiston, Idaho, will require 1020 tons of structural steel and 692 tons of reinforcing bars. Bids are asked at Olympia, Wash., March 1.

Union longshoremen are reluctant to load ships carrying scrap steel to Japan, and one boat was delayed in sailing from San Francisco last week. A Los Angeles boat is reported to have been loaded only after a destination subterfuge. Although domestic activity is negligible, Japanese demand for scrap is holding up well.

....ST. LOUIS....

...*Rail buying awaits ICC rate decision.*

ST. LOUIS, Feb. 8.—While the Missouri Pacific Railway and subsidiaries have been authorized by the Federal Court here to expend $9,210,538 during 1938, there has been no buying under that authority, and it is not expected that there will be any commitments until after the Interstate Commerce Commission has granted higher rates to the Missouri Pacific and other lines. The program includes 33,318 tons of rails for the parent and subsidiary companies.

Carnegie-Illinois Steel Corp., was awarded 379 tons of steel sheet piling by the St. Louis Board of Public Service. The State of Illinois opened bids today for highway projects including 590 tons of structural shapes.

There was some buying of galvanized sheets during the week, but very little of that. Users of steel generally are buying only what they require for some specific job, and are doing no forward buying.

Reductions for quantity on galvanized sheets have been made effective by warehouses here for delivery in the metropolitan St. Louis district as follows: 10 bundles, 10c. per 100 lb.; 25 bundles, 25c. per 100 lb. and 50 bundles, 50c. per 100 lb.

There continues to be a steady pick-up in shipments of pig iron against contracts but little new business. In the agricultural implement belt, operations are at about two-thirds of capacity. The only activity among stove foundries is repair work, and not much is expected before March 1.

Ingot operations are slightly down to 22 per cent of capacity.

...CINCINNATI...

...*Sheet demand hints at further improvement.*

CINCINNATI, Feb. 8.—The sheet steel market in this area is slowly but steadily improving. Current business is a trifle above last week and tends to expand weekly and some interests are suggesting that the anticipated upswing may be on its way. Ordering the past week was about 35 per cent of capacity output. Automotive specifications, heretofore relatively light, are increasing as new car production gets under way. Jobbers demand, for the second week, is unusually good, particularly for galvanized sheets. This business, normally appearing in spring, is well ahead of anticipation and gives rise to speculation as to possible expansion during the customarily heavy spring demand.

Mill operations are holding to a level about equal to demand. The leading district interest reports production in all its units, while other producers are staggering operations as efficiency requires.

The production of ingot steel is a trifle behind last week, which was the best level of this year. Fourteen open hearths out of 34 were operating at the close of the past week and reports indicate the same rate for this week.

Here and there small quantities of pig iron are being ordered for immediate use, but heavy or anticipatory demand is totally absent. Shipments on contract are fair, but there is nothing from the furnace standpoint to warrant optimism in the present market. In fact, as previously noted, movement on contract is primarily fourth quarter iron, since a substantial number of contracts were renewed at the turn of the year rather than allowed to expire.

Warehouse business is not encouraging. Anticipated improvement in the new year failed to materialize. Current business is almost entirely industrial, but approach of spring stimulates feeling of better construction demand.

...GERMANY...

...*Japan to buy 100,000 tons of bars; 20,000 tons bought in U. S.*

HAMBURG, Germany (By Mail).—The recent sharp reduction of prices for almost all iron and steel materials has not yet had the desired effect upon business. The European steel cartels ascertain, however, that no further reduction is contemplated. Inquiries for steel are large. Japan is in the market for 100,000 tons of steel bars, of which 20,000 tons were booked by America at a price of $42, which is nearly $6 below the European Steel Cartel's quotations. It is, however, expected that most of the balance will be booked by the Continental industry.

In January approximately 45 per cent of all steel orders from domestic sources had to be turned down. This is better than in the last quarter of 1937 when the percentage was 52 per cent. The German industry is not allowed to book orders which to execute would require more than 10 weeks. The pending steel demand, not yet placed, is estimated to represent another 14 weeks. The total unfilled demand is therefore equal to 24 weeks' production.

The Norddeutsche Hütte Bremen is constructing a fourth blast furnace of about 900 tons daily capacity.

German scrap merchants have established an organization which will cooperate with the scrap buyers (steel plants) and include also the small merchants. Export allotments to Poland and Italy, the only two countries which can buy in Germany, have been left unaltered. German domestic steel scrap prices are still a little lower than the world market prices.

The number of iron, steel and allied trades workmen on the payrolls at the end of December, 1937, was 62,000 higher than at the same time in 1936.

Colorado Fuel & Iron Reduces Salaried Workers

DENVER.—Effective March 1, salaried employees of the Colorado Fuel & Iron Corp. will be placed on a five-day work week instead of the present five and a half day week, with no reduction in the salary base, but they will be paid for only five days, it has been announced by W. A. Maxwell, Jr., vice-president. There has been no reduction in wage rates of hourly, tonnage or piecework employees.

. . . . CHICAGO . . . .

. . . Mill schedules show decline of one point.

o o o

. . . Sellers find little pressure for price cut.

o o o

. . . Illinois coal consumers fight new code rates.

CHICAGO, Feb. 8.—Despite a fractional operating increase by the leading district producer and the maintenance of last week's rate of ingot output at some other mills, downward revisions elsewhere result in a one point loss for the district to 24 per cent of capacity. Of the mills continuing the same number of open hearths this week as last, more business than is now being received must be seen in order to justify the continuance of present operations.

One large sales office reports sales about equal to those of last week and specifications slightly better. All increases, either in sales or orders, that have been reported in the past two months, with exception of those caused by rail tonnages, have been slight.

Although the rate of activity among makers of farm implements and tractors has lessened in recent weeks, the amount of decline at these plants relatively has not been great, and their orders still constitute an important part of the whole. It must be remembered, too, that the reports of greatly reduced operations at some tractor plants should not be attributed altogether to the farm equipment industry as the output of some of these manufacturers is to a large degree intended for industrial users.

An outstanding feature of present-day conditions is the almost emphatic lack of objection to current steel prices by all types and sizes of consumers. A survey today of local sales offices revealed that real and genuine disapproval of prices does not exist and that in practically every case reference to prices may be classified as purchasing agents' "feelers" and nothing more. It is also felt among the trade here that a wage reduction for steel labor, when the wages of other industries are being maintained, would be foolhardy.

Illinois industrial coal consumers are reporting that the new coal code prices fixed by the National Bituminous Coal Commission are threatening to drive them to other states where lower prices have been established. Illinois manufacturers are finding it ruinous to compete with manufacturers located in states with lower prices and even now some plants are taking surveys of production costs so as to give them a basis for procedure. Price fixing is also depriving many plants of the freight advantages accruing from being located near the mines.

Spokesmen here for the Carnegie-Illinois Steel Corp. said, in answer to reports that the corporation was planning to abandon plants at Elwood, Ind., New Castle, Farrell and Monessen, Pa., and Cambridge, Ohio, and transfer the operations of these plants to the company's new Irvin works near Pittsburgh, that such statements were without foundation and that "no decision whatsoever has been made to abandon any plants in Pennsylvania, Ohio or Indiana."

Heavy melting steel is quoted this week at $12.50 to $13, a reduction of 25c. a ton.

Structural Shapes and Reinforcing Bars

Little activity is noticeable in either shapes or bars this week, some fabricators reporting no inquiries at all for the entire week. A few awards and new projects contain no outstanding jobs and, with the exception of the Omaha bridge and Clarksville, Mo., dam, no large construction projects are in sight.

Pig Iron

The pig iron trade here feels that the bottom has been reached and that conditions will become no worse, although little encouragement for the immediate future is being offered just now.

Most of the foundries in this area are operating on a three-day basis and shipments of iron are holding steady, while consumption of foundry coke is showing a slight increase. In January, one blast furnace was blown out leaving 13 in blast. Machine tool and farm implement foundries are slackening their pace, the chief stimulus for the former seeming to be from abroad.

Wire and Wire Products

The past few weeks has shown a considerable improvement in rural demand for merchant wire products, but activity in these lines is still sluggish and below normal for the time of year. Wire sellers believe that rural dealers are awaiting the outcome of present steel labor negotiations in the East in the hope that if prices are to fluctuate, their stock buying may be governed accordingly. Usually country merchants must have stocks on hand by March 1, as much of the buying begins at that time. Since stocks are still rather low in this vicinity, it is believed that a considerable buying movement is yet to be seen.

Warehouse Business

Sales last month compared favorably with December and January of 1936, but were poor when compared with January, 1937. Likewise, business during the first week of February was a little under the first week in January, a little above the first February week, 1936, and considerably below the first seven days in February, 1937. The year 1938, it is believed by warehousemen here, will have much in common with 1936 as far as volume of sales is concerned. The steel now being ordered is in fill-in quantities and is for immediate consumption. Demand is diversified and no single item may be considered an outstanding performer.

Sheets and Strip

With the automobile industry still turning out relatively few assemblies each week, demand for these flat rolled products is correspondingly low and no great need for cold rolled body sheets is anticipated soon. Operations of plants making stoves and refrigerators, which normally consume

sheets and strip in fair quantities, also are quite poor, and one sheet producer states that some orders intended for February delivery to these particular manufacturers are being deferred in some cases to March and April. Specifications are being received regularly from the farm implement trade but in diminished volume.

Plates

Chief interest in this market is being shown by structural fabricators and tank makers, but orders are not so numerous as to prevent deliveries in two weeks or less. The proper stimulus for satisfactory rolling of plates in this district can be afforded only by the fairly constant building of new railroad equipment, of which the Milwaukee's consideration of 554 flat cars is a small step in the right direction.

Bars

The farm equipment industry has been of great assistance in recent months to bar producers, its continued operations and resulting orders being gratefully received. Now, however, even these manufacturers are showing somewhat of a tendency to slacken and since no support is in sight from elsewhere, demand for bars is falling off. Warehouses and some forgers are still active consumers, as are also many machine tool builders, but the aggregate volume is not holding up well.

January Steel Output at 20-Year Low For That Month Except 1932-1933

PRODUCTION in January of 1,732,266 gross tons of open-hearth and Bessemer steel ingots, as announced by the American Iron and Steel Institute, represented the lowest output for any January in the past 20 years except in 1932 and 1933.

The total was 63 per cent below the output of 4,724,894 gross tons in January of last year, which was the highest for any January on record.

January, 1938, production, however, was nearly 18 per cent greater than in December of last year when 1,472,241 gross tons was produced.

In producing last month's tonnage the steel industry operated at an average of 29.14 per cent of capacity, as against 25.36 per cent in December and 81.43 per cent in January of last year.

An average of 391,031 gross tons of ingots was produced per week in January, it is calculated. This figure compares with a calculated weekly output of 333,086 gross tons in December and with 1,066,567 gross tons in January, 1937.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which in 1936 Made 98.29 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies			
1937	Open-Hearth	Bessemer	Monthly	Weekly	Number of Weeks	Per Cent of Capacity
January	4,357,338	291,749	4,724,894	1,066,567	4.43	81.43
February	4,012,358	331,669	4,413,832	1,103,458	4.00	84.25
March	4,730,579	403,364	5,216,243	1,177,481	4.43	89.90
1st Quarter	13,100,275	1,026,782	14,354,969	1,116,250	12.86	85.23
April	4,601,620	388,768	5,070,445	1,181,922	4.29	90.24
May	4,685,749	382,582	5,149,851	1,162,495	4.43	88.76
June	3,832,514	284,572	4,183,762	975,236	4.29	74.46
2d Quarter	13,119,883	1,055,922	14,404,058	1,107,153	13.01	84.53
1st 6 Months	26,220,158	2,082,704	28,759,027	1,111,675	25.87	84.88
July	4,148,389	335,440	4,556,001	1,030,769	4.42	78.48
August	4,425,255	373,428	4,875,671	1,100,603	4.43	83.79
September	3,961,009	268,433	4,298,354	1,004,288	4.28	76.46
3d Quarter	12,534,653	977,301	13,730,026	1,045,699	13.13	79.61
1st 9 Months	38,754,811	3,060,005	42,489,053	1,089,463	39.00	83.10
October	3,148,668	189,244	3,392,691	765,844	4.43	58.31
November	2,005,136	113,761	2,153,781	502,047	4.29	38.22
December	1,361,716	86,835	1,472,241	333,086	4.42	25.36
4th Quarter	6,515,520	389,840	7,018,713	534,149	13.14	40.67
Total	45,270,331	3,449,845	49,507,766	949,516	52.14	72.39
1938						
January	1,604,363	99,991	1,732,266	391,031	4.43	29.14

RAILROAD BUYING

New Haven plans remodeling 50 cars formerly used on New York, Westchester & Boston Railway at a cost of $700,000, and overhauling and modernizing 100 of New Haven's old standard steel coaches at a cost of $553,000, in petitions presented to United States District Court.

International-Great Northern, a subsidiary of Missouri Pacific, has been authorized to expend $9980 for the following improvements to rolling stock:

To equip two air conditioned passenger cars with improved type evaporative condensers, $1,680; 105 freight cars with brake beam and bottom rod safety supports, $1,050; 20 cabooses with improved type emergency caboose valves, $770; two locomotives with thermic syphons, $2,560; 10 locomotives with blow off cocks, separators and mufflers, $1,410; 15 locomotives with blow off cocks on front boiler course, $2,150.

Gulf Coast Lines, a subsidiary of Missouri Pacific, has been authorized to expend $57,820 for the following improvements to rolling stock:

To equip two passenger cars with evaporative sub coolers, $1,250; 180 freight cars with AB air brakes, $42,400; 370 freight cars with brake beams and bottom rod safety supports, $3,700; 24 locomotives with power reverse gears $6,380; 50 locomotives with blow off cocks, $2,150.

St. Louis Public Service Co., St. Louis, has been authorized to spend $137,000 for 15 new buses.

RAIL AND TRACK SUPPLIES

New Haven contemplates purchase of 7580 tons of 131-lb. rails and track materials at a total cost of $587,000.

Board of Transportation, New York, has received a bid of $86,000 on 1827 tons of rails from Bethlehem Steel Co. for an extension of the Independent subway system to World's Fair site. Bethlehem was the only bidder.

American Steel Foundries reports for 1937 net profit of $3,617,761, an increase of 22½ per cent over 1936. A net loss of $55,437 was shown for the final quarter of 1937 after depreciation, as against a net profit in the corresponding quarter last year of $860,951.

A. M. Castle & Co., Chicago, steel warehouses, reports net earnings of $958,932.46 for the year ended Dec. 31, 1937, as compared with $559,377.45 for 1936. The company reports an increase of $499,293.77 in merchandise inventories because of increased costs as well as increased quantities.

Thomas Grate Bar Co., Birmingham, producer since 910 of grate bars and manufacturer of gray iron castings and special composition iron, has changed its name to Thomas Foundries, Ltd., Inc. Officers will be as heretofore: E. A. Thomas, president, and W. D. Webster, secretary-treasurer.

. . . CLEVELAND . . .

. . . February bookings of steel ahead of January.

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. . . Demand for oil country goods continues.

° ° °

. . . Ingot production in district up one point.

CLEVELAND, Feb. 8.—Ingot production is unchanged this week at 26 per cent in the Youngstown district and up one point to 27 per cent in the Cleveland-Lorain district due to better open-hearth activity by one plant.

Attention of the entire industry and its customers has been centered this week upon the wage negotiations in New York. Meanwhile, the aggregate volume of incoming orders is holding close to the level of the past few weeks. Because of the slow rate of improvement in the early part of January after the holiday, bookings so far in February are ahead of the comparable period last month.

A number of miscellaneous consumers long absent from the steel markets are gradually returning with limited orders. In many cases, stocks of steel have been exhausted, but plants are held back from reordering because of the large banks of products already fabricated and awaiting shipping releases. Particularly is this true among automotive parts makers.

While the recession has been felt in the oil industry, demand for oil country goods from tubular producers has declined less than any other single class of steel mill products. Drilling is well maintained and holds promise of approximating last year's rate, which would be favorably reflected in shipments of casings and accessories, pumps and other machinery. Activity in line pipe would be strengthened, it is believed, if another railroad freight rate increase were granted following the one late last fall.

A number of sheet producers have decided to eliminate the sale of secondary classifications below wasters.

The raw materials are maintaining their status quo. Heavy melting grades of scrap are unchanged, No. 1 steel remaining at $12 to $12.50 at Cleveland.

Pig Iron

Shipments and production are holding at the reduced rate which prevailed during the latter part of January. With inventories backed up all along the line, foundries find it difficult to increase their operations, and the daily melt in many cases is as much as 50 per cent below daily normal. Some iron producers see encouragement in slightly better demand for foundry coke and in the fact that numerous contracts for fourth quarter are being completed, which will ultimately result in additional orders.

Bars, Shapes and Plates

There has been very little change in bar, shape and plate specifications during the past week. Largest award for structural material was 1275 tons for the new shop buildings for American Rolling Mill Co. at Middletown, Ohio, placed with Joseph T. Ryerson & Sons, Inc., Chicago. Plans are now ready for three major contracts for the Main Avenue bridge in Cleveland, which will involve around 9000 tons of structural steel, in addition to reinforcing bars. After PWA approval is received, the three major contracts, including river piers, the remainder of the substructure, and the superstructure, may be released at once for bidding.

Sheets

Principal recent development in sheets has been the decision of a number of large mills to eliminate the sale of secondary classifications below wasters, returning the eliminated grades to the open hearths. This includes waste wasters, washer stock, side and end shearings, coil ends and flying shear cuts. Mills are understood to have taken this action in an effort to improve their prime business.

Sheet producers have found some encouragement recently through the receipt of small orders from consumers who have been long absent from the market, indicating exhaustion of these customers' inventories. Fabrication by miscellaneous industries is holding steady and continues ahead of shipments from mills to these sources. Releases from the automotive industry remain small. Michigan manufacturers and their parts makers have greatly reduced their stocks of steel, but parts makers are reported holding large banks of fabricated parts. In some steel quarters very little automotive buying is anticipated over the near future outside of necessary fill-in orders.

Wire Products

Mills are counting heavily upon the prosperity of numerous agricultural sections for increased sales in merchant wire products. In the Kentucky tobacco regions and in Texas and the Northwest, conditions are reported particularly encouraging. Jobbers at present appear to be holding back until receipt of an announcement on second quarter prices. The same hesitancy is noted among consumers of manufacturers' products.

Bolts, Nuts and Rivets

Bolt and nut producers are noticing February specifications to be a little better than those of the comparable period of January. Pent-up requirements are believed large, which would result in a heavy volume of business if some of the present uncertainties disappear. Rivet producers are encountering only routine demand from the railroads but the approaching naval work offers possibilities of fair volume over the next year.

Tubular Goods

Demand for oil country goods continues far better than any other consumption source for tubular products, and is one of the brightest spots in the steel industry's general picture. Drilling is holding up better than expected, resulting in steady casing requirements. Over the balance of this year it is anticipated that oil country activity will be comparable to last year. A number of export items are before producers and a number of pipe lines are in the planning stage.

CANADA

. . . Dominion mills report further gain in backlogs.

TORONTO, Feb. 8.—New business is appearing in increasing volume in the Canadian iron and steel markets, with sales largely for spot delivery. Both producers and warehouse operators report better demand for materials. Sheet sales have ad-

vanced during the past week or two and mills now are fairly well covered with contracts for the current quarter. Bar iron also is on the more active list with good orders appearing. Orders for structural steel have been slow, but several good orders are in prospect both for new building and bridge jobs.

Improvement in the mining industry is having a stimulating effect on steel sales to the mining fields while equipment demand also is on the increase and several companies have announced new mill installation programs. Agricultural implement industry and the automotive industry are steadily increasing operations.

Export demand for steel and finished products also has improved recently with most of the new business reported from Great Britain. W. J. Sanderson, president of Fleet Aircraft, Ltd., announces that orders have been closed for 120 planes with spare parts, representing expenditure of approximately $800,000, the orders being from the Canadian Government, domestic buyers and for export.

Merchant pig iron sales for the week exceeded 2000 tons and local blast furnace representatives state that new orders are increasing in number and tonnage involved. Some forward delivery buying was reported during the week, involving about 1500 tons and a few other small contracts are said to be pending. Most new business is for spot delivery and this is running better than 2000 tons per week, with regular deliveries reported on new order account and against contract.

Foundry iron is the most active, while malleable sales account for about 500 tons of the week's total. Production of pig iron continues around 82,000 tons monthly with six stacks blowing. Prices are firm and unchanged.

New interest is lacking in iron and steel scrap markets. Mills are taking delivery from local dealers and there is fair movement of heavy melting steel, turnings and other steel grades to the Hamilton mills through dealers that are taking output from producing plants. Iron grades also are spotty, with machinery cast and stove plate in demand with supplies light. Dealers report only small offerings from collectors of scrap.

Standard Brake Shoe & Foundry Co., Memphis, Tenn., and Pine Bluff, Ark., has appointed Modern Supply Co., 100 South Jefferson Street, Chicago, as its sales representative in the Chicago territory.

....BUFFALO....

... *District pig iron sales more numerous.*

BUFFALO, Feb. 8.—January was better, pig iron producers say, than the preceding December from the standpoint of number of sales. The tonnage was about the same, but there were a greater number of customers. Many melters who have been out of the market for months previously have bought iron. Steel fabricators have very few sizable projects to figure. In the future is the new Niagara Falls bridge to replace the 2300-ton collapsed structure. If present plans mature, two bridges, a public-owned and a privately-owned span, will be built, but it is believed that only one structure will result.

Also in the future is the $1,500,000 terminal station for the Buffalo, Niagara & Eastern to be built in this locality. Plans are not yet out.

The $40,000,000 bond issue approved by the voters last fall for a large budget of State institutional work will get under way with plans out some time in 1938, but the Legislature has not yet made its designations of the necessary work.

Necessity for condemnation proceedings is holding up the Cheektowaga, N. Y., State bridge involving 300 tons of piling and a lesser amount of other grades of steel.

Operations of open hearths show a pickup. Republic has lighted two furnaces, making eight active in the district.

...BOSTON...

... *Iron quotations hold but demand lags.*

BOSTON, Feb. 8.—A few hundred tons of Indian iron was moved the past week but domestic furnace representatives generally reported business as flat and prospects of orders not bright. However, furnaces are holding prices firmly pending the decision on an advance in freight rates. The New England pig iron melt has not increased. Average weekly operations are not more than three days a week.

Manufacture of electrical equipment, one of the most active industries in 1937, has slipped perceptibly this year. One manufacturer sold 60,000 units of one product in January, 1937, and 5000 last January. One concern has reduced working forces to a minimum and is operating on a greatly reduced scale. The Westinghouse Electric & Mfg. Co., Springfield, Mass., plans to close for two weeks. When resuming, it probably will operate three days a week.

..BIRMINGHAM..

... *Active stacks in South decline to 11.*

BIRMINGHAM, Feb. 8.—Two blast furnaces were taken off last week, No. 4 of the Sloss-Sheffield Steel & Iron Co. on Feb. 1 and Fairfield No. 5 of the Tennessee Coal, Iron & Railroad Co. on Feb. 3. The active blast furnace total is now 11, with the Tennessee Coal, Iron & Railroad Co., operating five, Woodward Iron Co., three; Sloss-Sheffield Steel & Iron Co., two; Republic Steel Corp., one.

Republic Steel Corp. increased its steel production last week, adding a third open hearth. Tennessee Coal, Iron & Railroad Co. worked five at Fairfield and three at Ensley, giving the district a total of 11 units. The same number is scheduled for this week.

Current steel and pig iron bookings consist mostly of small spot orders. Contract tonnage is limited. Aggregate bookings have not been large. The outlook for February pig iron shipments is somewhat better and it is now expected that the February movement will exceed that for January.

Illinois Coal Mines Cut Production

CHICAGO.—Many mines in Illinois which normally would be operating at near capacity at this season of the year have been forced to cut production as much as 50 per cent because of the price differential existing between Illinois and neighboring states. It is understood that thousands of tons of Illinois coal are awaiting shipment in freight cars with no market because of the cheaper prices afforded other producers by the Federal price fixing edict. Coal operators state that if this discrimination is not remedied, many mines in Illinois, which is the third largest coal producing state, will be forced to close.

. . . . NEW YORK. . . .

. . .Steel buying shows little or no improvement.

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. . . Buyers holding off, awaiting wage announcement.

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. . . Japan may buy 50,000 tons of pig iron.

NEW YORK, Feb. 8.—Attention of steel executives in New York was sharply focused this week on two important meetings, both of which will have a marked effect on steel business during the near future, the one in the domestic field and the other in export trade. The meeting of widest significance, of course, was that between the Steel Workers Organizing Committee and the United States Steel Corp. for renewal of its wage contract. Buyers have been awaiting the outcome because of the possible effect on price policies. The export meeting between representatives of the European Steel Cartel and the Steel Export Association of America may have far reaching effects on world steel prices.

Domestic steel business, so far as this territory is concerned, follows the pattern of the rest of the country —an uneven course, with little or no indication of positive improvement. Sales by some companies in the past week were larger than in the week previous.

Pig Iron

Operating with small heats and irregular schedules, local foundrymen continue to limit purchases strictly to their immediate needs. January sales were slightly above December, but present indications are that February business will show little, if any, improvement over January. Considerable interest is centered on the outcome of negotiations between the United States Steel Corp. and the SWOC as it is felt that an agreement extending the present wage level will act to allay the fear of lower prices that has been discouraging purchases of iron beyond current needs. A few small inquiries for export iron were received during the week, notably one for about 500 tons for South America, but little buying is being done. Japan is in the market for about 50,000 tons of iron, most of which is likely to be placed with Southern furnaces.

Plates and Sheets

The local plate market has yet to recover from its lethargy and the immediate outlook is none too promising. High bids of local shipyards precludes them getting away of the Maritime Commission ships. About 250 tons of plates will be bought in the next few days for the six locomotives the American Locomotive Co. is to build for the Milwaukee Road, and bids will soon be called for a 56-in. welded pipe line by the Borough of Brooklyn. No freight car business is in sight. Most promising source of new orders is the oil industry, which is not holding back in refinery modernization programs.

Sheet business is spotty and fluctuates from week to week. Jobber business is lacking, but manufacturers are taking carlots fairly frequently.

Reinforcing Bars

An inquiry for 90 tons of bars for the main span piers of the Meeker Street bridge in Brooklyn raised the tonnages pending on public works to 1290 tons. No private projects of any size are in the offing. Bar sales to small lot buyers are very light as buyers continue the practice of purchasing only sufficient material to cover their current needs. W. Ames & Co., Jersey City, were low bidders on 150 tons for WPA projects.

. . PHILADELPHIA . .

. . . District operations remain at 29 per cent.

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. . . U. S. Steel-CIO negotiations delay buying.

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. . . Shipbuilding is bright spot in this territory.

PHILADELPHIA, Feb. 8.—Miscellaneous orders for all types of steel products so far in February are totaling about 15 per cent better than the January average. However, the aggregate tonnage involved is still hardly able to support the present operating rate of 29 per cent, which is unchanged from last week.

Sellers here say that the total district consumption is better than present orders indicate, but are of the opinion that much routine buying is being held up until some announcement is forthcoming with regard to the meeting of the CIO with the United States Steel Corp. on wage rates.

Releases to local autobody stamping plants are a little more plentiful, but the improvement so far is nothing to encourage even a mild form of optimism. The railroads still decline to purchase even routine requirements, and the Reading shops continue to be closed down practically 100 per cent, with the Pennsylvania shops in little better position. In fact, Pennsylvania's shops are so lightly manned that a scrap list for February will not be assembled and sold. Added discouragement comes into the railroad picture on the news that Pennsylvania has a far greater plate inventory than had been believed, and, even though these plates are for the completion of a definite car building program, there is little likelihood of additional buying for many months, even if rate advances are permitted by the ICC.

The district will undoubtedly have a good year as regards shipbuilding, with Sun Shipbuilding Co. particularly busy. Although no announcement has been made regarding the

Standard Oil tankers or the cargo vessels of the Maritime Commission, it is likely that Sun will get a good portion of both lots. Opening of bids on the latter group of boats disclosed that Hess Welded Ship & Barge Co. (one way in Cramp's old yard) was low on one boat, and Tampa Shipbuilding & Engineering Co. (Florida) was low on a group of four. There is a feeling, however, that neither yard is equipped to handle work of this magnitude, in which case Sun would be the only shipyard here which would get some of this work.

Pig Iron

Consumption continues at a slow pace, and buying is nil. Like finished steel buyers, the average pig iron user is withholding all buying action for reasons that he can hardly define, although hesitancy regarding business conditions in general and pig iron prices in particular are the major depressing factors. A fair stock has been built up in district furnace yards, but this inventory in no way overhangs the market or should be considered as distress material. Firm European inquiry has been negligible for some weeks now, but Japan, encouraged by a decline in charter rates to 19s., is now in the market for commitments aggregating 50,000 tons and quite likely will soon close definite contracts with several furnaces, probably in the South, for this tonnage.

Sheets and Strip

Day-to-day orders are more numerous, but the total volume involved is of little consequence. This district can show no worthwhile improvement until the railroads and autobody stamping plants come into the market, and it looks as if neither will snap up buying for at least a month or six weeks. Radio plants are not interested in new material, and tank fabricators have few orders on their books. Jobbers are generally over-

Plates and Shapes

Miscellaneous plate turnover is still desultory, and a carload order is the exception. Salesmen hope to get a portion of forthcoming releases on tankers and cargo vessels, whereas little support from the railroads is expected for many a month yet. The structural shapes sellers are particularly fortunate in having some state work to fight over, as private construction has long ceased to be much of a factor here. About 300 tons of shapes was awarded during the week for armories in Philadelphia and Allentown, and 195 tons went to Phoenix for a school at Scotland, Pa. New shapes projects include 200 tons for a Wernersville school and 700 tons for a Scranton hospital. Reinforcing steel is listless and prices are ragged. Concrete Steel Co. took a total of 260 tons for state buildings at Scotland and Cheyney, Pa., and Whitaker Construction Co. secured 220 tons for a teachers college at Mansfield, Pa.

Imports

The following iron and steel imports were received here during the past week: 5618 tons of chrome ore from South Africa; three tons of steel tubes, two tons of steel forgings and eight tons of steel bars from Sweden.

FABRICATED STEEL

STRUCTURAL STEEL AWARDS

NORTH ATLANTIC STATES

New York, 340 tons, 138th Street underpass, Bronx westerly approach, Triborough bridge, to American Bridge Co., Pittsburgh.

Brooklyn, 235 tons, general store annex, Procurement Division, United States Treasury Department, to Belmont Iron Works, Philadelphia.

Philadelphia, 160 tons, special troop armory, to Keystone Structural Steel Co., Trenton, N. J.

Mount Lebanon, Pa., 500 tons, junior high school, to Reliance Steel Products Co., Pittsburgh.

Allentown, Pa., 155 tons, armory, to Bethlehem Contracting Co., Bethlehem, Pa.

Scotland, Pa., 205 tons, addition and alterations to orphans' school, to Phoenix Bridge Co., Phoenixville, Pa.

Cheyney, Pa., 110 tons, Teachers' Training School, to Max Corchin, Philadelphia.

Economy, Pa., 110 tons, girders, to Fort Pitt Bridge Works Co., Pittsburgh.

Coraopolis, Pa., 100 tons, armory, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Baltimore, 335 tons, Boston Steel Construction Co. plant, to Belmont Iron Works, Philadelphia.

Owings Mills, Md., 181 tons, trade school, to an unnamed fabricator.

THE SOUTH

Washington County, Ala., 330 tons, highway bridge, to Virginia Bridge Co., Roanoke, Va.

Corpus Christi, Tex., 500 tons, derricks, to Muskogee Iron Works, Muskogee, Okla.

CENTRAL STATES

Springfield, Ill., 320 tons, livestock pavilion, to Illinois Steel Bridge Co., Jacksonville, Ill.

Middletown, Ohio, 1285 tons, American Rolling Mill Co., to Joseph T. Ryerson & Son, Inc., Chicago.

Allouez, Wis., 190 tons, ore spouts, Great Northern Railway, to American Bridge Co., Pittsburgh.

State of Wisconsin, 250 tons, two bridges, to Fort Pitt Bridge Works Co., Pittsburgh.

Booneville, Mo., 307 tons, Missouri River bridge, to Fort Pitt Bridge Works Co., Massillon, Ohio.

WESTERN STATES

San Jose, Cal., 144 tons, building for L. Hart & Son, to Hellwig Iron Works, San Jose.

Pasadena, Cal., 160 tons, post office addition, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Grafton, Mass., 150 tons, State hospital ward and service building.

Stamford, Conn., 320 tons, building, Union Industries, Inc.

New York, 400 ton, steel curbing, New York Central Railroad.

Brooklyn, 130 tons, rectory and auditorium, Roman Catholic Church.

Hadley, N. Y., 340 tons, school building.

Trenton, N. J., 240 tons, roller skating rink, Garden Roller Skating Rink Co.

Pittsburgh, 5000 tons, Highland Park bridge for Allegheny County.

Wernersville, Pa., 200 tons, hospital bids Feb. 15.

Scranton, Pa., 700 tons, hospital; bids Feb. 11.

Harrisburg, Pa., 400 tons, coaling stations for Ogle Construction Co.

SOUTH AND SOUTHWEST

Louisville, Ky., 250 tons, protection angles, etc., Ohio River dams Nos. 47, 51, 62 and 53, United States Engineer's Office.

Tuscaloosa, Ala., 250 tons, dam No. 1, United States Engineer's Office.

Birmingham, 220 tons, underpass.

Stillwater, Okla., 450 tons, two college buildings.

CENTRAL STATES

Dearborn, Mich., 600 tons, open-hearth furnaces, Ford Motor Co.

Lawrence County, Ohio, 170 tons, State bridge over Paddy Creek.

State of Illinois, 590 tons, highway bridges; bids opened Feb. 8.

Carroll, Iowa, 200 tons, bridge.

Lyons, Kan., 500 tons, derricks.

WESTERN STATES

Boulder City, Nev., 120 tons, supporting structures, specification 1031-D, Bureau of Reclamation.

Lewiston, Idaho-Clarkston, Wash., 1020 tons, Snake River highway bridge; bids March 1.

Compton, Cal., 318 tons, Southern Pacific San Pedro branch line bridge over Compton Creek for United States Engineer; Columbia Steel Co., Los Angeles, low bidder.

FABRICATED PLATES

AWARDS

Smith's Bluff, Tex., 875 tons, tanks for Pure Oil Co., to Chicago Bridge & Iron Works, Chicago.

SHEET PILING

AWARDS

New York, 200 tons, Tallmans Island sewage disposal plant, to L. B. Foster Co., Inc., New York.

St. Louis, 379 tons, for Board of Public Service, to Carnegie-Illinois Steel Corp.

. . .NON-FERROUS. . .

. . . Consumers show little interest in 10c. copper.

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. . . Zinc prices lowered to 5.10c., New York.

° ° °

. . . Tin market quiet and featureless.

NEW YORK, Feb. 8.—The domestic non-ferrous markets passed through another week of light sales. Soft securities prices, the uncertainty surrounding future Federal policies, the lower prices on the London metal exchange and steadily rising stocks continue to act as a damper on the domestic market. The only bright spot on the horizon is the proposed rearmament program which will undoubtedly call for substantial tonnages of non-ferrous metals. Domestic copper sales, amounting to 2350 tons for the month through Saturday, are accounted for chiefly by intercompany transactions. The present electrolytic quotation of 10c. per lb., Connecticut Valley, has received little attention from independent consumers who have intensified their practice of covering only imperative needs. Export prices, after advancing as high as 10c. earlier in the week, have declined to 9.70c., c.i.f., usual base ports, today's level.

The Week's Prices. Cents Per Pound for Early Delivery

	Feb. 2	Feb. 3	Feb. 4	Feb. 5	Feb. 7	Feb. 8
Electrolytic copper, Conn.*	10.00	10.00	10.00	10.00	10.00	10.00
Lake copper, N. Y.	10.125	10.125	10.125	10.125	10.125	10.125
Straits tin, spot, New York	41.00	40.50	40.50	..	40.50	40.50
Zinc, East St. Louis	5.00	5.00	5.00	5.00	5.00	4.75
Zinc, New York	5.35	5.35	5.35	5.35	5.35	5.10
Lead, St. Louis	4.75	4.75	4.75	4.75	4.75	4.60
Lead, New York	4.90	4.90	4.90	4.90	4.90	4.75

*Delivered Connecticut Valley: price ¼c. lower delivered in New York.
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 15.625c. a lb., prompt, f.o.b., New York.
Antimony, American, 13.75c. per lb., prompt shipment, New York.
Quicksilver, $78.00 to $81.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 10.25c. a lb., less carload, delivered in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	41.75c. to 42.75c.
Tin, bar	43.75c. to 44.75c.
Copper, Lake	11.00c. to 12.00c.
Copper, electrolytic	11.00c. to 12.00c.
Copper, castings	10.50c. to 10.75c.
*Copper sheets, hot-rolled	18.125c.
*High brass sheets	16.625c.
*Seamless brass tubes	19.375c.
*Seamless copper tubes	18.625c.
*Brass rods	12.625c.
Zinc, slabs	6.50c. to 7.50c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	11.50c.
Lead, American pig	6.00c. to 7.00c.
Lead, bar	7.125c. to 8.125c.
Lead, sheets, cut	8.50c.
Antimony, Asiatic	16.00c. to 17.00c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	29.00c. to 31.00c.
Babbitt metal, commercial grade	20.00c. to 50.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	44.75c.
Tin, bar	46.75c.
Copper, Lake	11.00c. to 11.25c.
Copper, electrolytic	11.00c. to 11.25c.
Copper, castings	10.75c.
Zinc, slabs	7.25c. to 7.50c.
Lead, American pig	5.40c. to 5.65c.
Lead, bar	8.90c.
Antimony, Asiatic	18.50c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	48.75c.
Solder, ½ and ½	26.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.75c.	8.50c.
Copper, hvy. and wire	7.125c.	7.625c.
Copper, light and bottoms	6.25c.	6.50c.
Brass, heavy	4.50c.	5.125c.
Brass, light	3.625c.	4.375c.
Hvy. machine composition	6.625c.	7.125c.
No. 1 yel. brass turnings	4.625c.	5.125c.
No. 1 red brass or compos. turnings	6.375c.	6.875c.
Lead, heavy	4.00c.	4.375c.
Cast aluminum	9.875c.	11.00c.
Sheet aluminum	11.50c.	13.00c.
Zinc	2.875c.	3.125c.

Zinc

Domestic prime Western quotations were lowered $5 per ton this morning to a basis of 5.10c. per lb., New York, following by two days the publishing of the adverse January statistics which indicated an increase in domestic stocks of 23,756 tons to 88,532 tons, the heaviest reserves reported since July, 1936. The decline in production of 3100 tons to 48,687 tons was more than offset by the drop in shipments from 29,545 tons in December to 24,931 tons in January. Unfilled orders at the end of January totaled 45,400 tons against 48,339 in the previous month. Spot spelter on the London exchange this morning was quoted at 3.13c. per lb., down 14 points from a week ago.

Lead

The fact that March books, which were opened a week ago, have been practically ignored illustrates the sentiment that is guiding buyers at present. The week's light volume of sales, mostly all carlots, leaves about 25 per cent of February's requirements yet to be purchased. Domestic quotations were dropped this morning to 4.75c., New York, while prices in London have declined from 3.54c., last Tuesday's prices, to 3.34c. per lb., this morning's quotation on spot metal.

Tin

The market has been stagnant all week. The lack of any kind of buying activity has kept prices over the last four days unchanged at 40.50c. per lb., New York, for Straits metal, prompt shipment. The average price for the seven-day period ended today is 40.60c. This morning better inquiry was reported, but whether this will turn into business is questionable. On first call in London this morning, prompt Straits metal was quoted at £178 15s.

Average Prices in January

The average prices of the major non-ferrous metals in January, based on the daily quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, Conn. Valley	10.425c.
Lake copper, Eastern delivery	10.865c.
Straits tin, spot, New York	41.536c.
Zinc, East St. Louis	5.00c.
Zinc, New York	5.35c.
Lead, St. Louis	4.72c.
Lead, New York	4.87c.

IRON AND STEEL SCRAP

. . . Market is softer and prices are off at many points.

o o o

. . . Composite declines 8c. to $13.92.

FEB. 8.—In the continued absence of mill buying and following the publication of the estimate of the American Iron and Steel Institute that inventories of purchased steel scrap at mills were 45 per cent larger at the end of 1937 than at the end of 1936, most markets have begun to exhibit signs of softness. Sentiment at Chicago has reduced the asking price on No. 1 steel 25c., making it quotable at $12.50 to $13, and other grades, including railroad material, are off 50c. to $1. While export buying is sustaining the price on Nos. 1 and 2 steel at Pittsburgh and Philadelphia, at the latter point most other items are off 50c. and blast furnace material $1. Blast furnace material is also off 50c. at Cleveland, and practically the whole list has suffered declines at Buffalo, where the mill that has been carrying out some price averaging arrangements is about to drop its offering price 50c. on No. 1 steel, to $12.50 a ton. St. Louis dealers have reduced asking prices on the leading grades in the hope of attracting mill buying. Net result is a decline of 8c. in the composite price, bringing it to $13.92 after having remained at $14 for five weeks.

Lacking new orders, export buying is beginning to lose its edge, and prices have already softened at Boston. New York buying prices, maintained for months, may show a turn next week.

Pittsburgh

The market continues sluggish, with little or no interest being evinced by either buyers or sellers. Despite this lack of interest, market quotations continue unchanged as dealers are obliged to pay $14 a ton for No. 1 steel on what little transactions are being made. The influence of export buying continues as a dominant factor in underlying market strength.

Chicago

The continuation of low mill operating schedules causes this market to drift on week after week without sales of importance and with nominal price quotations. Sentiment being weaker and No. 1 steel purchasable at $13 and under, that grade is being quoted 25c. less at $12.50 to $13. It is difficult to buy at this price, however, and it is almost certain that a mill sale will bring at least 50c. a ton higher. Shipments into local mills are in small volume and some purchasing agents state they have not bought large tonnages for months, in one case this lapse amounting to six months. Weakness in other items in this market is reflected by quotations ranging from 25c. to $1 lower.

Philadelphia

Utterly lifeless, this market is now undergoing price revisions on all items other than Nos. 1 and 2 steel. Machine shop turnings and blast furnace grades are the outstanding distress items. Continued buying for export, as well as occasional deliveries to one domestic consumer, serves to hold No. 1 at near $15 and No. 2 in the neighborhood of $14. A 7000-ton boat is now loading at Port Richmond for Italian delivery, a smaller boat is expected in tomorrow to take the January Budd bundles to Europe, and still another boat is due on the 12th, also for Europe. Japanese charter rates are far down, now being 19s. or less, but large-scale orders are still being withheld in the absence of Government exchange permits.

Cleveland

The whole market continues weak here, with blast furnace grades off 50c. from last week's quotations. Mixed borings and turnings are being shipped to one mill on a very limited schedule by a number of dealers in rotation. Only small tonnages were involved in the recently monthly railroad lists and prices commanded by these lists failed to strengthen the local market. With open-hearth operations still spotty, mills have not yet found it necessary to augment their supplies of the heavy melting grades.

Buffalo

The market is weaker. One large consumer has been offering $13 under its price averaging arrangement, but has received so much material that it was reported that this price would be dropped to $12.50 before the end of the week. This mill is said to have received 14,000 tons under the price-averaging arrangement plus 10,000 tons owed prior to Dec. 6, which makes total receipts of nearly 25,000 tons since that date. Most avenues of outlet for dealers are blocked, delay orders recently having been received on No. 1 machinery cast shipments.

St. Louis

Steel mills in the St. Louis industrial district having indicated to dealers that they might buy melting steel at lower levels, Selected and No. 1 grades have been cut 25c. a ton and No. 2 reduced 50c. Dealers believe that there will be some buying at present quotations. Another reason given for the declines is that dealers find they can buy at the lower prices. The Missouri Pacific list of 55 carloads closing this week probably will be taken by St. Louis dealers. However, it is expected that but little if any of the 6100 tons to be sold by the Louisville & Nashville will come here.

Cincinnati

Some foundry scrap for movement by barge was sold the past week, but this was without market significance. Trading generally is in small quantities and no market test has appeared since last quarter. Prices are unchanged and nominal, scrap being worth whatever trading skill can get.

Detroit

Scrap lists closed during the last week brought speculative prices in line with price quotations, thus sustaining the market for another week. However, the average of bids submitted is in a lower range than those offered recently, indicating that in general there is not as much underlying strength as was previously believed to exist. The next important automotive list is that of Fisher Body in the middle of the month.

New York

Dullness characterizes the present market. No new sales into domestic consumption have been reported for weeks, and prices for material on cars are purely nominal. Even the export trade has lost its kick, for although there is no let up in shipments, it has been almost three months since the last order was placed. It is estimated that the last of this material will be shipped in the next six weeks. Meanwhile, the exporters deny that the European steel cartel group now in the United States for the purpose of stabilizing finished steel prices are making any overtures on scrap, even though the director of the scrap buying division is among the foreign delegation. Export buying prices are tending toward the soft side, if anything. Japanese buying is confined to a few thousand tons at a time.

Boston

For a small tonnage of No. 1 steel, $14.50 a ton on dock was paid the past week, but the market today is definitely 50c. a ton lower. With the weakness has come a slowing up of export operations, because exporters' orders are beginning to run low. The American Steel & Wire Co., Worcester, Mass., purchased a small tonnage of No. 1 steel at $13.50 a ton on cars and then withdrew from the market. Dribbling lots of breakable steel are moving to eastern Pennsylvania at $9.75 a ton on cars. Steel turnings have been dropped to $2.60 a ton on cars, and bundled skeleton to $6.50 to $6.75, the decline in both cases being quite abrupt. Machinery and textile cast is moving in a small way at $13 to $15.50 a ton delivered, the wide spread in prices being accounted for by a differenec in freight rates.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel	$14.00 to $14.50
Railroad hvy. mltng...	15.50 to 16.00
No. 2 hvy. mltng. steel	13.00 to 13.50
Scrap rails	15.00 to 15.50
Rails 3 ft. and under..	18.00 to 18.50
Comp. sheet steel.....	14.00 to 14.50
Hand bundled sheets..	13.00 to 13.50
Hvy. steel axle turn..	12.50 to 13.00
Machine shop turn....	8.00 to 8.50
Short shov. turn.....	8.00 to 8.50
Mixed bor. & turn.....	6.75 to 7.25
Cast iron borings	6.75 to 7.25
Cast iron carwheels..	15.00 to 15.50
Hvy. breakable cast...	12.50 to 13.00
No. 1 cupola cast.....	16.00 to 16.50
RR. knuckles & cplrs..	18.00 to 18.50
Rail coil & leaf springs	18.00 to 18.50
Rolled steel wheels....	18.00 to 18.50
Low phos. billet crops.	18.00 to 18.50
Low phos. sh. bar.....	17.50 to 18.00
Low phos. punchings..	17.00 to 17.50
Low phos. plate, hvy..	17.00 to 18.00
Low phos. plate clips..	15.00 to 15.50
Steel car axles	17.50 to 18.00

PHILADELPHIA

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel	$14.50 to $15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Hydraulic bund., new.	14.50 to 15.00
Hydraulic bund., old..	10.50 to 11.00
Steel rails for rolling..	16.00 to 16.50
Cast iron carwheels...	15.00 to 15.50
Hvy. breakable cast...	13.00 to 13.50
No. 1 cast	15.50 to 16.00
Stove plate (steel wks.)	12.00 to 12.50
Railroad malleable	15.00 to 15.50
Machine shop turn....	6.50 to 7.00
No. 1 blast furnace....	6.00 to 6.50
Cast borings	7.50 to 8.00
Heavy axle turnings...	10.50 to 11.00
No. 1 low phos. hvy...	17.00 to 17.50
Couplers & knuckles..	17.00 to 17.50
Rolled steel wheels....	17.00 to 17.50
Steel axles	19.00 to 19.50
Shafting	18.50 to 19.00
No. 1 RR. wrought....	15.00 to 15.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire.....	11.00 to 11.50
Cast borings (chem.)..	12.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$12.50 to $13.00
Auto. hvy. mltng. steel alloy free	11.00 to 11.50
No. 2 auto. steel	10.50 to 11.00
Shoveling steel	12.50 to 13.00
Hydraul. comp. sheets.	11.50 to 12.00
Drop forge flashings...	10.25 to 10.75
No. 1 busheling	11.25 to 11.75
No. 2 busheling, old...	5.75 to 6.25
Rolled carwheels	15.00 to 15.50
Railroad tires, cut....	16.25 to 17.25
Railroad leaf springs.	16.00 to 16.50
Steel coup. & knuckles	15.00 to 15.50
Axle turnings	12.00 to 12.50
Coil springs	17.50 to 18.00
Axle turn. (elec.).....	12.50 to 13.00
Low phos. punchings..	16.00 to 16.50
Low phos. plates, 12 in. and under	15.50 to 16.00
Cast iron borings	6.00 to 6.50
Short shov. turnings...	8.00 to 8.50
Machine shop turn....	5.50 to 6.00
Rerolling rails	15.25 to 15.75
Steel rails under 3 ft...	15.50 to 16.00
Steel rails under 2 ft...	16.00 to 16.50
Angle bars, steel.....	15.25 to 15.75
Cast iron carwheels...	14.75 to 15.25
Railroad malleable ...	14.25 to 14.75
Agric. malleable	12.25 to 12.75
	Per Net Ton
Iron car axles	$18.50 to $19.00
Steel car axles	17.00 to 17.50
No. 1 RR. wrought....	10.00 to 10.50
No. 2 RR. wrought	10.75 to 11.25
Locomotive tires	16.25 to 16.75
Pipes and flues	9.25 to 9.75
No. 1 machinery cast..	12.00 to 12.50
Clean auto. cast	11.75 to 12.25
No. 1 railroad cast....	11.25 to 11.75
No. 1 agric. cast.....	11.00 to 11.50
Stove plate	8.75 to 9.25
Grate bars	9.00 to 9.50
Brake shoes	8.50 to 9.00

YOUNGSTOWN

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
Hydraulic bundles	12.50 to 13.00
Machine shop turn.....	9.50 to 10.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.00 to $12.50
No. 2 hvy. mltng. steel.	11.00 to 11.50
Comp. sheet steel	11.50 to 12.00
Light bund. stampings.	8.50 to 9.00
Drop forge flashings...	11.00 to 11.50
Machine shop turn. ...	7.50 to 8.00
Short shov. turn.....	8.50 to 9.00
No. 1 busheling	11.00 to 11.50
Steel axle turnings ...	10.00 to 10.50
Low phos. billet and bloom crops	18.00 to 18.50
Cast iron borings	8.00 to 8.50
Mixed bor. & turn.....	8.00 to 8.50
No. 2 busheling	8.00 to 8.50
No. 1 cast	16.00 to 16.50
Railroad grate bars ..	8.00 to 8.50
Stove plate	8.00 to 8.50
Rails under 3 ft.	17.50 to 18.00
Rails for rolling	16.00 to 16.50
Railroad malleable	16.00 to 16.50
Cast iron carwheels...	15.00 to 15.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$12.50 to $13.00
No. 2 hvy. mltng. steel.	10.50 to 11.00
Scrap rails	12.50 to 13.00
New hvy. b'ndled sheets	11.00 to 11.50
Old hydraul. bundles..	10.00 to 11.00
Drop forge flashings..	10.50 to 11.00
No. 1 busheling	10.50 to 11.00
Hvy. axle turnings....	11.00 to 11.50
Machine shop turn....	.... to ....
Knuckles & couplers..	16.00 to 16.50
Coil & leaf springs....	16.00 to 16.50
Rolled steel wheels....	16.00 to 16.50
Low phos. billet crops.	17.00 to 17.50
Shov. turnings	8.00 to 8.50
Mixed bor. & turn.....	7.00 to 7.50
Cast iron borings.....	7.00 to 7.50
Steel car axles	16.00 to 16.50
No. 1 machinery cast..	15.00 to 15.50
No. 1 cupola cast.....	13.50 to 14.00
Stove plate	11.50 to 12.00
Steel rails under 3 ft...	17.50 to 18.00
Cast iron carwheels...	14.50 to 15.00
Railroad malleable ...	14.50 to 15.00
Chemical borings	10.00 to 10.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$12.75 to $13.25
No. 1 hvy. melting....	12.75 to 13.25
No. 2 hvy. melting....	11.50 to 12.00
No. 1 locomotive tires.	16.00 to 16.50
Misc. stand.-sec. rails.	14.00 to 14.50
Railroad springs	15.50 to 16.00
Bundled sheets	10.00 to 10.50
No. 1 busheling	7.00 to 7.50
Cast bor. & turn.....	6.00 to 6.50
Rails for rolling	14.50 to 15.00
Machine shop turn....	6.00 to 6.50
Heavy turnings	8.50 to 9.00
Steel car axles	19.50 to 20.00
Iron car axles	21.50 to 22.00
No. 1 RR. wrought....	8.00 to 8.50
No. 2 RR. wrought....	12.75 to 13.25
Steel rails under 3 ft..	13.00 to 13.50
Steel angle bars	14.50 to 15.00
Cast iron carwheels...	13.50 to 14.00
No. 1 machinery cast..	12.75 to 13.25
Railroad malleable	13.50 to 14.00
No. 1 railroad cast....	12.00 to 12.50
Stove plate	9.00 to 9.50
Agricul. malleable	10.00 to 10.50
Grate bars	9.50 to 10.00
Brake shoes	9.50 to 10.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.50 to $10.00
No. 2 hvy. mltng. steel.	7.50 to 8.00
Scrap rails for mltng.	14.50 to 15.00
Loose sheet clippings.	6.00 to 6.50
Hydrau. b'ndled sheets	9.50 to 10.00
Cast iron borings.....	3.50 to 4.00
Machine shop turn....	4.00 to 4.50
No. 1 busheling	8.00 to 8.50
No. 2 busheling	3.00 to 3.50
Rails for rolling.....	16.50 to 17.00
No. 1 locomotive tires.	13.00 to 13.50
Short rails	17.00 to 17.50
Cast iron carwheels...	11.50 to 12.00
No. 1 machinery cast.	10.50 to 11.00
No. 1 railroad cast....	9.00 to 9.50
Burnt cast.	5.50 to 6.00
Stove plate	5.50 to 6.00
Agricul. malleable	10.50 to 11.00
Railroad malleable ...	12.50 to 13.00
Mixed hvy. cast.	7.50 to 8.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$11.50 to $12.00
Scrap steel rails	14.00 to 14.50
Short shov. turnings..	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought....	.... 10.00
Rails for rolling	15.00 to 16.00
No. 1 cast	14.00 to 16.50
Tramcar wheels	14.00 to 15.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.50 to $10.00
No. 2 hvy. mltng. steel.	8.00 to 8.50
Borings and turnings..	6.25 to 6.75
Long turnings	5.75 to 6.25
Short shov. turnings...	6.75 to 7.25
No. 1 machinery cast.	11.75 to 12.25
Automotive cast	12.75 to 13.25
Hvy. breakable cast...	10.25 to 10.75
Hydraul. comp. sheets.	10.75 to 11.25
Stove plate	7.50 to 8.00
New factory bushel....	9.50 to 10.00
Old No. 2 busheling...	5.00 to 5.50
No. 2 busheling (black fender stock)	Nominal
Sheet clippings	7.25 to 7.75
Flashings	8.50 to 9.00
Low phos. plate scrap.	10.50 to 11.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$11.00 to $11.50
No. 2 hvy. mltng. steel.	9.50 to 10.00
Hvy. breakable cast...	10.50 to 11.00
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.00 to 9.50
Steel car axles	20.00 to 20.50
Shafting	16.00 to 16.50
No. 1 RR. wrought....	11.50 to 12.00
No. 1 wrought long...	10.00 to 10.50
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling.....	16.00 to 16.50
Clean steel turnings*..	5.00 to 5.50
Cast borings*	5.00 to 5.50
No. 1 blast furnace....	5.00 to 5.50
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	7.50 to 8.00
Light iron	4.00 to 4.50

Per gross ton, delivered local foundries:

No. 1 machn. cast.....	$15.50 to $16.00
No. 2 cast	13.00 to 13.50

*$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.30 to $13.80
Scrap rails	13.30 to 13.80
No. 2 steel	12.30 to 12.80
Breakable cast	.... 9.75
Machine shop turn.....	.... 2.60
Mixed bor. & turn.....	.... 2.60
Bun. skeleton long....	6.50 to 6.75
Shafting	17.00 to 17.50
Cast bor. chemical....	6.25 to 6.50

Per gross ton delivered consumers' yards:

Textile cast.....	$13.00 to $15.50
No. 1 machine cast....	13.00 to 15.50

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$11.65 to $12.15
No. 2 hvy. mltng. steel.	10.65 to 11.15

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$10.50	$9.50
No. 2 hvy. mltng. steel.	9.50	8.50
Mixed dealers steel....	8.50	7.50
Scrap pipe	8.50	7.50
Steel turnings	7.50	7.00
Cast borings	8.50	7.50
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	11.00	10.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel.	$13.50
No. 2 hvy. mltng. steel.	12.00
No. 2 cast	11.00
Stove plate	8.50 to 9.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.....	$14.00
No. 2 hvy. mltng. steel.....	13.00
Rails (scrap)	14.00
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$37.00
Forging quality	43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	2.10c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	48.00
F.o.b. Worcester, Mass.	49.00
F.o.b. Birmingham	50.00
F.o.b. San Francisco	56.00
F.o.b. Galveston	53.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.45c.
F.o.b. Chicago or Gary	2.50c.
F.o.b. Duluth	2.60c.
Del'd Detroit	2.60c.
F.o.b. Cleveland	2.50c.
F.o.b. Buffalo	2.55c.
Del'd Philadelphia	2.75c.
Del'd New York	2.80c.
F.o.b. Birmingham	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars Pacific Ports	3.00c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.35c.
F.o.b. Buffalo	2.40c.
F.o.b. Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.85c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.45c.
F.o.b. Buffalo, Cleveland Youngstown, Chicago, Gary or Birmingham	2.50c.
Del'd Detroit	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars dock Pacific ports	2.95c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.30c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.35c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.80c.

Iron

F.o.b. Chicago	2.40c.
F.o.b. Pittsburgh (refined)	3.60c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.90c.
F.o.b. Cleveland, Chicago and Gary	2.95c.
F.o.b. Buffalo	3.00c.
F.o.b. Detroit	2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Gary	2.30c.
Del'd Cleveland	2.445c.
F.o.b. Coatesville or Spar. Pt.	2.35c.
Del'd Philadelphia	2.44c.
Del'd New York	2.54c.
F.o.b. Birmingham	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.
Wrought iron plates, f.o.b. Pittsburgh	3.80c.

Floor Plates

F.o.b. Pittsburgh	3.50c.
F.o.b. Chicago	3.55c.
F.o.b. Coatesville	3.60c.
F.o.b. cars dock Gulf ports	3.90c.
F.o.b. cars dock Pacific ports	4.05c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago	2.30c.
Del'd Cleveland	2.445c.
F.o.b. Buffalo or Bethlehem	2.35c.
Del'd Philadelphia	2.465c.
Del'd New York	2.5125c.
F.o.b. Birmingham (standard)	2.40c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.80c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Chicago or Buffalo	2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports	3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb.	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$43.00
Light rails (from rail steel) per gross ton	42.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.40c.
No. 10, f.o.b. Gary	2.50c.
No. 10, del'd Detroit	2.60c.
No. 10, del'd Philadelphia	2.70c.
No. 10, f.o.b. Granite City	2.60c.
No. 10, f.o.b. Birmingham	2.55c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.
No. 10 wrought iron, P'gh	4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	3.15c.
No. 24, f.o.b. Gary	3.25c.
No. 24, del'd Detroit	3.35c.
No. 24, del'd Philadelphia	3.45c.
No. 24, f.o.b. Granite City	3.35c.
No. 24, f.o.b. Birmingham	3.30c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	3.10c.
No. 10 gage, f.o.b. Gary	3.20c.
No. 10 gage, f.o.b. Detroit	3.30c.
No. 10 gage, del'd Philadelphia	3.40c.
No. 10, f.o.b. Granite City	3.30c.
No. 10 gage, f.o.b. Birmingham	3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.55c.
No. 20 gage, f.o.b. Gary	3.65c.
No. 20 gage, del'd Detroit	3.75c.
No. 20 gage, del'd Philadelphia	3.85c.
No. 20, f.o.b. Granite City	3.75c.
No. 20 gage, f.o.b. Birmingham	3.70c.
No. 20 gage, f.o.b. cars, dock Pacific ports	4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.30c.
No. 24, f.o.b. Gary	3.90c.
No. 24, del'd Philadelphia	4.10c.
No. 24, f.o.b. Granite City	4.00c.
No. 24, f.o.b. Birmingham	3.95c.
No. 24, f.o.b. cars, dock, Pacific ports	4.40c.
No. 24, wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars dock, Pacific ports	4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Gary	3.60c.
No. 20, f.o.b. Granite City	3.70c.
No. 20, f.o.b. cars dock Pacific ports	4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb.	3.30c.
No. 28, Gary	3.40c.
No. 28, f.o.b. Granite City	3.50c.
No. 28, cars dock Pacific ports, boxed	4.175c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.35
Standard cokes, f.o.b. Gary	5.45
Standard coke, f.o.b. Granite City	5.55

Special Coated Manufacturing Ternes

	Base per Box
F.o.b. Pittsburgh	$4.65
F.o.b. Gary	4.75
F.o.b. Granite City	4.85

Roofing Terne Plate
(*F.o.b. Pittsburgh*)
(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Hot-rolled Hoops, Bands, Strip and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	2.40c.
All widths up to 24 in., Chicago	2.50c.
All widths up to 24 in., del'd Detroit	2.60c.
All widths up to 24 in., Granite City	2.60c.
All widths up to 24 in., Birmingham	2.55c.
Cooperage stock, Pittsburgh	2.50c.
Cooperage stock, Chicago	2.60c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	3.20c.
F.o.b. Cleveland	3.20c.
Del'd Chicago	3.48c.
F.o.b. Worcester	3.40c.

*Carbon 0.25 and less.

Cold Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.45c.
No. 14, Worcester	3.85c.
No. 20, Pittsb'gh or Cleveland	3.85c.
No. 20, Worcester	4.25c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.75
Smooth coated nails	2.75
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$3.15
Galvanized fence wire	3.55
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column	.75
Single loop bale ties, base col...	.62

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	..52	31	⅛ & ¼	+13	+35
⅛ to ⅜	..55	38½	½	..20	1½
½	..59½	49	¾	..26	8
¾	..62½	53	1 & 1¼	..30	14
1 to 3	..64½	55½	1½	..34	16½
			2	..33½	16

Lap Weld

2	..57	47½	2	..26½	10
2½ & 3	..60	50½	2½ to 3½	27½	12½
3½ to 6	..62	52½	4	..29½	16
7 & 8	..61	50½	4½ to 8	..28½	15
9 & 10	..60½	50	9 to 12	..24½	10
11 & 12	..59½	49			

Butt Weld, extra strong, plain ends

⅛	..50½	36½	¼ & ⅜	+14	+48
¼ to ⅜	..52½	40½	½	..21	4
½	..57½	48½	¾	..27	10
¾	..61½	52½	1 to 2	..34	17½
1 to 3	..63	55			

Lap Weld, extra strong, plain ends

2	..55	46½	2	..29½	13½
2½ & 3	..59	50½	2½ to 4	..35	20½
3½ to 6	..62½	54	4½ to 6	..33½	19
7 & 8	..61½	51	7 & 8	..34½	19½
9 & 10	..60½	50	9 to 12	..28	15½
11 & 12	..59½	49			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d.	13 B.W.G.	11.21	9.96
1½ in. o.d.	13 B.W.G.	12.38	11.00
1¾ in. o.d.	13 B.W.G.	14.09	12.51
2 in. o.d.	13 B.W.G.	15.78	14.02
2¼ in. o.d.	13 B.W.G.	17.60	15.63
2½ in. o.d.	12 B.W.G.	19.37	17.21
2¾ in. o.d.	12 B.W.G.	21.22	18.85
2¾ in. o.d.	12 B.W.G.	22.49	19.98
3 in. o.d.	12 B.W.G.	23.60	20.97
4½ in. o.d.	10 B.W.G.	45.19	40.15
3½ in. o.d.	11 B.W.G.	29.79	26.47
4 in. o.d.	10 B.W.G.	36.96	32.83
5 in. o.d.	9 B.W.G.	56.71	50.38
6 in. o.d.	7 B.W.G.	87.07	77.35

Extra for less-carload quantities:

40,000 lb. or ft. or over					Base
30,000 lb. or ft.	to	39,999	lb. or ft.		5%
20,000 lb. or ft.	to	29,999	lb. or ft.		10%
10,000 lb. or ft.	to	19,999	lb. or ft.		20%
5,000 lb. or ft.	to	9,999	lb. or ft.		30%
2,000 lb. or ft.	to	4,999	lb. or ft.		45%
Under 2,000 lb. or ft.					65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in. f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, $3 extra
4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:	
½ in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
⅛ in. and larger	60
Stove bolts in packages, nuts attached	70
Stove bolts in packages, with nuts separate	70 and 10
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.60
F.o.b. Chicago or Birmingham	3.70

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more.)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	3.00c.
Delivered, Detroit	3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
200 (½% Nickel)	$0.35
2100 (1½% Nnickel)	0.75
2300 (3½% Nickel)	1.55
2500 (5% nickel)	$2.25
3100 Nickelichromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	80c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	22s. 6d. to 23s.
Steel bars, open hearth	£11
Beams, open-hearth	£11 2s. 6d.
Channels, open-hearth	£11 7s. 6d.
Angles, open-hearth	£11 2s. 6d.
Black sheets, No. 24 gage	£14
Galvanized sheets, No. 24 gage	£16 15s.

CONTINENTAL

Per Gross Ton, Gold £.
f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet bars	Nominal
Plate ¼ in. and up	£6 17s.
Plate 3/16 in. and 5 mm.	£6 13s.
Sheet, ⅛ in.	£7 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 15s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.70c.
Structural shapes	3.70c.
Soft-steel bars and small shapes	3.80c.
Reinforcing steel bars	2.45c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large . . . .1 to 24 kegs	$3.65
	Per Cent Off List
Track bolts, all sizes per 100 count	55
Machine bots, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	$4.35
Wire, black, soft ann'l'd, base per 100 lb.	$3.30
Wire, galv. soft, base per 100 lb.	$3.70
Common wire nails, per keg	$2.90
Cement coated nails, per keg	$2.90

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

* Delivered in Pittsburgh switching district.

** Prices on application.

CHICAGO *Base per Lb.*

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	$4.40
Track bolts (keg lots)	5.05
Rivets, structural (keg lots)	**4.95
Rivets, boiler (keg lots)	**5.05
	Per Cent Off List
Machine bolts and carriage bolts, ½ in. and smaller	60
Lag screws	*55 and 5
Hot-pressed nuts, sq. and hex., tap or blank, ½ by 6 in. and smaller	60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.25 to 7.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled: strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.00c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.50c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ⅛ in. and heavier	5.60c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.
	Per Cent Off List
Machine bolts, square head and nut: All diameters. Prices on application	
Carriage bolts, cut thread: All diameters. Prices on application	

* For 1500 lb. or more; add 0.25c. on smaller lots. No. 28 and lighter, 36 in. wide, 20c. per 100 lb. higher.

ST. LOUIS

	Base per Lb
Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot - rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	5.29c.
Boiler rivets	5.39c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	50
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, nuts; all quantities	60

* No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.90c.
*Structural shapes	3.90c.
*Soft steel bars, small shapes, iron bars (except bands)	4.00c.
‡Reinforc. steel bars, square and deformed	3.53c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	4.10c.
*Spring steel	5.50c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	4.00c.
*Diam. pat. floor plates, ¼ in.	5.25c.

These prices are for delivery in Philadelphia trucking area.

* Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.
†Reinforc. steel bars	2.50c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95
	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count ½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

† Outside delivery 10c. less.

* For 5000 lb. or less.

‡ Plus switching and carriage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.95c.
Floor plates	5.55c.
Bars, rounds, flats and angles.	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$3.48
Com. wire nails, base per keg: Any quantity less than carload.	3.20
Cement c't'd nails, base 100-lb. keg.	3.50
Chain, lin. per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes. 2-in.	20-73
4-in.	48.41

BUFFALO *Base per Lb.*

Plates	3.92c.
Floor plates	5.52c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON *Base per Lb.*

Channels, angles	4.20c.
Tees and zees, under 3 in.	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern.	5.13c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.49c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

*Under 400 lb., .50c. over base. 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60–5
1⅛ in. and larger	60
Coach and lag screws	60–5
Hot-pressed nuts, sq. and hex. tapped or blank, 1–199 lb.	50
200 lb. and over:	
½ in. and smaller	62½
9/16 to 1 in.	60
1⅛ in. and over	50

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BIRMINGHAM

Bars and bar shapes	$3.85 base	
Structural shapes and plates	3.75	"
Hot rolled sheets No. 10 ga.	3.80	"
Hot rolled sheets No. 24 ga.	4.40	" 3500 lb. and over
Galvanized sheets No. 24 ga.	5.05	" 3500 lb. or more
Strip	4.05	"
Reinforcing bars	3.85	"
Floor plates	5.96	"
Cold finished bars	4.91	"
Machine and carriage bolts	50 & 10 off list	
Rivets (structural) $4.60 base		

On plates, shapes, bars, hot rolled strip, heavy hot rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.50c.
Galvanized sheets, No. 24, 100 bdls. or more	$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb. All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Reinforcing shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	$3.55
Bolts and nuts, per cent off list	60

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	2.975c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.25c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.45c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carolad	$3.40	$3.20	$3.40

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester	$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.47
Delivered Newark or Jersey City	26.53
Delivered Philadelphia	25.84
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.27
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	20.38

*Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$25.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.61
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.53
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.00
Delivered Cincinnati	25.61
Delivered Canton, Ohio	25.89
Delivered Mansfield, Ohio	26.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$28.50

Gray Forge

Valley or Pittsburgh furnace	$23.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.24

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic 19 to 21%	$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50% $33.50

For each additional 0.50% silicon up to 17%, 50c. per ton is added.

Manganese 2 to 3%, $1 per ton additional. For each unit of manganese over 3%, $1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50% $27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$101.50*
2.50% carbon	106.50*
2% carbon	111.50*
1% carbon	121.50*

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$2.00
Ferrotungsten, lots of 500 lbs., nominally	2.05
Ferrotungsten, smaller lots, nominally	2.10
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron Nominally 17 to	18c.
Iron, basic or foundry, Swedish, aver. 65% iron. Nominally	16c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	50c.
Man., African, Indian, 44-48%	45c.
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominal

Per Net Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$23.50 to $25.00
Tungsten, domestic, scheelite delivered	$20.00 to $25.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	$16.00
Rhodesian, 45%	22.00
Rhodesian, 48%	25.50
Turkish, 48-49%	25.00 to $26.00
Turkish, 45-46%	23.00 to 23.50
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
50%	$25.50 to $26.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00 to $19.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2¼% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.875c.
Del'd Cleve'd, No. 4 industrial	5.75c.
Del'd Cleve'd, No. 5 industrial	4.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$4.00 to $4.25
Furnace, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	11.05
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports	14.75

..CAST IRON PIPE..

Rockport, Mass., is having plans drawn for a water system to cost about $29,000. John H. Dennis is chairman of the selectmen. Metcalf & Eddy, 1300 Statler Building, Boston, are architects.

Centerville-Osterville, Mass., have voted to install water pipe, fire hydrants, pumping station and pumping station equipment at a cost of $432,000. Plans are being drawn. C. H. Brown is chairman of water commission.

North **Aurora, Ill.,** will take bids soon for pipe lines for water system and other waterworks installation, including 60,000-gal. elevated steel tank on steel tower, pumping machinery and accessories. Walter Deuchler, 63 South LaSalle Street, Aurora, is consulting engineer.

Holden, Mo., plans extensions in water pipe lines and other waterworks improvements. Bond issue of $23,000 has been authorized.

Shreveport, La., plans pipe line extensions and replacements in water system; also other waterworks improvements. Fund of $135,000 is being arranged for this and extensions in sewage system. R. N. Allen is commissioner of public utilities, in charge.

Allerton, Iowa, asks bids until Feb. 14 for pipe lines for water system and other waterworks installation, including elevated steel tank and tower, and water treatment plant. Cost about $45,000.. Hall Engineering Co., Centerville, Iowa, is consulting engineer.

Jeffersonville, Ohio, has taken bids on 200 tons of cast iron water pipe and will award contract Feb. 10.

Upper Arlington, Ohio, has received low bid from J. B. Clow & Sons, Chicago, on 100 tons of cast iron water pipe.

William Loomis & Sons, Logan, Ohio, are low bidders on general contract for 100 tons for Circleville, Ohio.

Rensselaer Water Co., Rensselaer, N. Y., plans main 20-in. pipe line for water supply from new reservoir to be built near municipality; also pipe lines for extensions in distribution system. Cost about $500,000 including new dam, reservoir and other construction. Barker & Wheeler, 36 State Ctreet, Albany, N. Y., are consulting engineers.

Oelrichs, S. D., plans 2 to 8-in pipe for water system. Dakota Engineering Co., Western Building, Mitchell, S. D., is consulting engineer.

Maplewood, N. J., plans about 6300 ft. of 6-in. for extensions in water system. E. F. Eld, 225 Morris Avenue, Summit, N. J., is chief engineer; Commonwealth Water Co., same address, is engineer.

Wauwatosa, Wis., plans pipe lines for water system in Jackson Park Boulevard and West North Avenue; also new elevated steel tank and tower, and other waterworks improvements. M. F. Linnan is city engineer.

Highland Park District, Topeka Township, near Topeka, Kan., J. A. Lemons, 1605 East Twenty-ninth Street, Topeka, chairman of board, will begin work soon for about 25 miles of 4 and 12-in. for water system; also 250,000-gal. elevated steel tank and tower, and other waterworks installation. Cost about $400,000. Harry H. Staley, New England Building, Topeka, is consulting engineer.

Water Improvement District No. 9, near Tulsa, Okla., care of W. R. Holway, Tulsa, consulting engineer, plans pipe lines for extensions and replacements in water system.

Sweet Home, Ore., plans pipe lines for water system and other waterworks installation. Cost about $40,000. Financing is being arranged. H. L. Gilbert, Couch Building, Portland, is consulting engineer.

Spokane, Wash., has purchased 197 tons of 6, 8 and 12-in. pipe from Pacific States Cast Iron Pipe Co., Provo, Utah.

United States Treasury Procurement Office, San Francisco, has purchased 190 tons 6-in. pipe from United States Pipe & Foundry Co., San Francisco.

Wenatchee, Wash., has rejected all bids on 175 tons 4, 6 and 10-in. pipe and has called for new bids.

Long Beach, Cal., has taken bids on 1900 tons of 4 to 20-in. pipe.

Seattle, Wash., Water District No. 3 asks bids Feb. 11 on 37,628 ft. of 4-in. and 1700 ft. of 6-in. pipe and fittings. W. H. Harris, 1164 Empire Bldg., Seattle, is secretary.

Eugene, Ore., South Willamette Street Water Supply District, closes bids Feb. 18 on 125 tons of ¾ to 6-in. pipe and fittings. Cast iron not specified. Specifications from C. E. Mercer, engineer, 861 Willamette Street, Eugene, Ore.

AIRLESS

BLAST CLEANING EQUIPMENT

THE NEW PANGBORN ROTOBLAST "ROCKER" BARREL

An Airless Cleaning Machine Designed to Handle Flat, Mixed, Long and Fragile Work. Also All General Cleaning Work.

THIS compact Airless Barrel, with its Folding Conveyor Drum, is Pangborn's answer to the demand of industry for a super cleaning machine. Designed for flat, mixed, long and fragile work, as well as all the usual sizes and types of gray iron, steel, alloy and malleable castings; forgings; steel products and heat-treated parts, etc., this machine gives fast cleaning with low power, labor and maintenance costs. Made in 7 and 14 cubic feet capacity.

Write for Bulletin No. 209

PANGBORN CORPORATION · HAGERSTOWN, MARYLAND

THE WORLD'S LARGEST MANUFACTURER OF BLAST CLEANING AND DUST CONTROL EQUIPMENT

PANGBORN

January Iron Output Down Only 4.1 Per Cent

PRODUCTION of coke pig iron in January totaled 1,429,085 gross tons compared with 1,490,324 tons in December. The daily rate last month showed a decline of only 4.1 per cent from that in December, or from 48,075 tons to 46,100 tons.

On Feb. 1 there were 91 furnaces making iron, operating at a rate of 46,035 tons daily, compared with 95 furnaces on Jan. 1, producing at the rate of 44,470 tons daily. Seven furnaces were blown out or banked and three were blown in. Independent producers took four off blast and merchant producers put out or banked three furnaces. Of the three furnaces blown in, one belonged to an independent producer and the other two were merchant stacks.

Among the furnaces blown out or banked were the following: Standish, Chateaugay Ore & Iron Co.; one Eliza, Jones & Laughlin Steel Corp.; Anna, Struthers Iron & Steel Co.; one Otis, Otis Steel Co.; one Calumet, Wisconsin Steel Co.; one Ford Motor Co. furnace; and North Birmingham No. 4, Sloss-Sheffield Steel & Iron Co.

The three furnaces put in blast were a Sparrows Point unit of the Bethlehem Steel Co., one Pioneer furnace, Republic Steel Corp., and a Woodward Iron Co. furnace.

The number of available furnaces making pig iron has been reduced from 239 to 238 by the abandonment of one of the Lackawanna furnaces of Bethlehem Steel Co.

Daily Average Production of Coke Pig Iron

Gross Tons

	1938	1937	1936	1935	1934
January	46,100	103,597	65,351	47,656	39,291
February	....	107,115	62,886	57,448	45,131
March	....	111,596	65,816	57,098	52,245
April	....	113,055	80,125	55,449	57,561
May	....	114,104	85,432	55,713	65,900
June	....	103,584	86,208	51,570	64,338
½ year	....	108,876	74,331	54,138	54,134
July	....	112,866	83,686	49,041	39,510
August	....	116,317	87,475	56,816	34,012
September	....	113,679	91,010	59,216	29,935
October	....	93,311	96,512	63,820	30,678
November	....	66,891	98,246	68,864	31,898
December	....	48,075	100,485	67,950	33,149
Year	....	100,305	83,658	67,556	43,592

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1938	1937	1938	1937
January	1,429,085	3,211,500	22,388	23,060
February	....	2,999,218	....	24,228
March	....	3,459,473	....	27,757
April	....	3,391,665	....	26,765
May	....	3,537,231	....	34,632
June	....	3,107,506	....	34,415
½ year	....	19,706,593	....	170,857
July	....	3,498,858	....	23,913
August	....	3,605,818	....	29,596
September	....	3,410,371	....	26,100
October	....	2,892,629	....	26,348
November	....	2,006,724	....	25,473
December	....	1,490,324	....	22,674
Year	....	36,611,317	....	324,961

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made,-Daily Rate

Tons

	1938	1937	1936	1935	1934
January	10,635	16,106	10,537	3,926	7,800
February	....	16,514	11,296	6,288	7,071
March	....	16,457	10,831	7,089	7,197
April	....	14,517	13,897	8,799	8,838
May	....	19,483	12,814	8,441	9,099
June	....	15,870	14,209	7,874	9,499
July	....	19,609	11,619	8,644	7,880
August	....	17,831	12,148	8,194	6,043
September	....	20,065	12,526	10,090	4,986
October	....	18,950	13,645	11,199	5,765
November	....	15,662	14,739	12,503	6,610
December	....	10,964	14,852	13,312	4,399

Production by Districts and Coke Furnaces in Blast

(Gross Tons)

Furnaces	Production: January (31 Days)	Production: December (31 Days)	Feb. 1: Number in Blast	Feb. 1: Operating Rate, Tons a Day	Jan. 1: Number in Blast	Jan. 1: Operating Rate, Tons a Day
New York:						
Buffalo	110,465	108,257	7	3,565	7	3,490
Other New York and Mass.	5,929	15,332	0	..	1	245
Pennsylvania:						
Lehigh Valley	53,097	50,134	5	1,715	5	1,615
Schuylkill Valley	27,271	26,323	2	880	2	850
Susquehanna and Lebanon Valleys	10,982	12,831	1	355	1	415
Ferromanganese	.....	.....	0	.....	0	.....
Pittsburgh District	247,611	238,981	15	8,050	16	7,860
Ferro. and Spiegel	11,305	11,006	2	365	2	355
Shenango Valley	21,251	17,648	1	685	1	570
Western Pennsylvania	38,561	27,549	2	1,245	2	795
Ferro. and Spiegel	5,671	6,435	1	185	1	125
Maryland	86,044	86,633	4	3,375	3	2,220
Wheeling District	82,936	82,195	5	2,675	5	2,175
Ohio:						
Mahoning Valley	86,319	108,441	5	2,670	6	2,660
Central and Northern	118,964	132,080	7	3,660	8	3,840
Southern	25,079	24,687	3	810	3	795
Illinois and Indiana	261,785	283,550	13	8,270	14	9,035
Michigan and Minnesota	47,964	74,364	3	1,450	4	2,145
Colorado, Missouri and Utah	23,758	25,393	2	765	2	820
Ferromanganese	.....	.....	0	.....	0	.....
The South:						
Virginia	.....	.....	0	.....	0	.....
Ferromanganese	.....	1,453	0	.....	0	.....
Kentucky	10,899	7,006	1	350	1	225
Alabama	147,782	143,635	11	4,790	10	4,030
Ferromanganese and Spiegel	5,412	6,391	1	175	1	205
Tennessee	.....	.....	0	.....	0	.....
Total	1,429,085	1,490,324	91	46,035	95	44,470

Pittsburgh Gas Meeting Will Hear Metallurgists

Steel men attending the annual industrial gas sales conference of the Industrial Gas Section, American Gas Association at the William Penn Hotel, Pittsburgh, March 7 and 8, will hear papers on "Immersion Heating Capitalizes the Advantages of Gas For Soft Metal Melting" by Elmer B. Dunkak, vice-president, The C. M. Kemp Mfg. Co., Baltimore; "Improvements in Crucible Melting With Gas" by Ralph D. Hawkins, Bridgeport Gas Light Co., Bridgeport, Conn., chairman, non-ferrous metals committee and Oliver D. Pritchard, Brooklyn Union Gas Co., Brooklyn; "A Discussion of Up-to-date Gas Forging Practices," by M. W. Martin, Public Service Co. of Indiana, Indianapolis, and "Heating Galvanizing Pots With Convection Gas Heat."

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Order volume low, but inquiries show an increase in all districts.

° ° °

. . . Automotive plants begin to line up equipment for 1939 changes.

° ° °

. . . Ford and General Motors start tool and die programs.

Inquiries Out for 1938 Auto Programs; Die Shops Active

DETROIT—Tool and die programs at Ford and General Motors have been officially launched, a certain indication that outside firms will soon be busy preparing for 1939 production. About 1500 tool makers returned to work at Ford's a week ago and Fisher called its men back Monday. Plans for equipping Ford's new press shop are progressing rapidly, with inquiries out now for approximately 300 presses. Machine inquiries generally showed a sharp increase about the first of the month with planning being done for a new Pontiac engine in addition to others recently reported. Very little of the automotive business has reached the order-taking stage, but sales are expected in the next week or ten days.

Toolroom Equipment Builders Report Increase in Orders

CLEVELAND—The January volume of machine tool sales in this district was slightly improved over December, and the first few days of February have resulted in a continuation of the modest gains. However, in comparison with one year ago, domestic business is very poor, and manufacturers are rapidly catching up on their deliveries, partly due to the fact numerous consumers have requested delayed deliveries until general business conditions improve.

Toolroom equipment manufacturers find increased call for the repair and modernization of older machines which in better times would be relegated to secondary departments. Ford Motor Co. is understood to have placed some special equipment for its new die shop. The same automobile manufacturer is reported inquiring for special equipment needed in the production of its smaller motors, which are increasingly better in demand. Chesapeake & Ohio Railroad has purchased all the tools for which it was inquiring recently. Among the domestic markets which are holding up fairly well is the oil industry.

Brisk Domestic Inquiries Make Cincinnati Builders Optimistic

CINCINNATI—The machine tool market is steadily quiet. Domestic demand is still well behind normal anticipations, while foreign ordering shows the greater briskness. As noted heretofore, business from home sources reflects a wide and apparently sincere interest in retooling. Business from abroad is from both European and Asiatic interests and ranges from one or two tools to orders of fair substance, although information as to exact quantities is withheld. All types of tools except drills are in current orders, the number fluctuating with price and size. As last week, lathes, millers and grinders are still most active in demand.

Market optimism is still noticeable as manufacturers indicate the steady and apparently sincere rate of inquiry. Plant operations are at the same level as last week, just under 50 per cent of capacity.

Sentiment Good in Chicago, Based on Inquiries

CHICAGO—Machine tool sales offices here report that business has continued on a low level in the past week. Inquiries, however, are said to be fairly numerous, with indications that some may materialize into orders this quarter. Sentiment in the trade remains on the optimistic side for the most part, the general feeling still being that the present recession is only temporary. Backlogs of equipment manufacturers are being worked further down, but they still are large enough to support the present rate of production another 60 to 90 days. Current operations in the trade average between 60 and 70 per cent of capacity. Nothing further has been announced on the Burlington's plan to spend $1,000,000 for improvements and expansion at its shops in Burlington, Iowa.

Gulf Coast Line To Buy $21,670 Worth Machinery

ST. LOUIS—The Gulf Coast Lines, a subsidiary of the Missouri-Pacific, has been authorized by the Federal Court at St. Louis to expend $21,670 for shop machinery and tools, including the following: One 10-ft. ⅜-in. capacity squaring shear and one 12-ft. ½-in. capacity press brake, $13,237; one 30-ton drop pit jack and motor, $1200; one shell planing and one single shoe-and-wedge attachment for draw cut shaper, $1500; one 100-ton ball bearing jack, $1000; two reversible pneumatic impact wrenches, $850; two portable paint spraying outfits, $700; two portable pipe threading machines, $770; two electric plating machines, $850; and one 400-amp. electric welding machine, $800.

The International-Great Northern Railway, another subsidiary of the Missouri-Pacific, has been authorized by the Federal Court at St. Louis to expend $12,270 for shop machinery and tools as follows: One shell planing attachment, $1500; one 1½-ton electric operated hoist, $1810; one metal cut-off saw, $2000; two 50-ton ball bearing air jacks, $700; two portable pipe threading machines, $780; two 100-ton ball bearing jacks, $1100; two paint spraying outfits, $600; one 30-ton hydraulic drop jack, $1000; one motor driven woodworking machine, $650; two 100-ton, air-operated jacks, $1100; one small hollow chisel mortising machine, $1030.

Inquiries for Replacement Rise at Pittsburgh

PITTSBURGH—Machine tool dealers hope for a better volume of business in the near future, but orders during the past week reflected little or no improvement from recent activity. However, the volume of inquiries increased slightly. January business was a trifle ahead of the December volume. Inquiries and orders cover the general list of machine tools with no one item outstanding. Interest in equipment for expansion purposes has subsided considerably because of business conditions and the majority of new orders involve replacements. Westinghouse Electric & Mfg. Co., East Pittsburgh, has an inquiry out for a list covering turret lathes, surface grinders, drill presses, radial drills and punch presses.

Orders Off, Inquiries Active In Metropolitan Area

NEW YORK—Orders placed during the first week of the month were at an extremely low level, totaling only a few machines for the whole district. The trade is in an optimistic frame of mind, however, since inquiries are coming in from a great many sources. It is difficult to predict how many of these will culminate in orders within the next few weeks, but it is obvious that a great many manufacturing executives are getting figures ready to convince top management of the soundness of replacing obsolete equipment with the latest types, on the basis of savings in costs. One of the largest plants in this area, for example, has a host of examples where new equipment would pay for itself within a year on the basis of direct labor cost savings. A number of screw machines are up for consideration on this basis at a number of plants, and one district factory representative reports orders so far this year equal to the volume of the like period in 1937. The sales staff of this particular concern has been behind in catching up with its "request" calls during the past fortnight.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Corn Products Refining Co., 17 Battery Place, New York, plans multi-story addition to refinery at Pekin, Ill. Cost about $275,000 with equipment. Company engineer, Chicago office, 333 North Michigan Avenue, is in charge.

Wells Brothers Iron & Plate Works, 1344 Webster Avenue, New York, manufacturer of iron and steel products, has leased one-story building at 36-17 Twenty-second Street, Long Island City, for new plant.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Feb. 18 for 55 to 165 dynamotor units and spare parts (Circular 114).

T. J. Ronan Co., Inc., 749 East 135th Street, New York, manufacturer of paints, varnishes, oils, etc., has leased five-story building at Willow Avenue and 135th Street, about 30,000 sq. ft. of floor space, and will improve for plant.

Petroleum Conversion Corp., 100 East Forty-second Street, New York, manufacturer of refined oils, is removing its plant from Texas City, Tex., to building recently leased at Bayway Terminal, Bayway, Elizabeth, N. J., totaling about 22,000 sq. ft. of floor space, where increased capacity will be carried out, including steel tank storage and distributing facilities.

Purchasing and Contracting Officer, Quartermaster Corps, Fort Slocum, N. Y., asks bids until Feb. 18 for one portable, down-draft, fire-box steel boiler (Circular 842-33).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 18 for molybdenum alloy steel tubing (Schedule 2771) for Brooklyn Navy Yard; until Feb. 25, for discharge hose assemblies (Schedule 2782) for Brooklyn, Mare Island and Puget Sound yards.

Coca-Cola Bottling Co. of New York, Inc., 431 East 165th Street, New York, has purchased one-story building at Madison and Park Avenues, Paterson, N. J., totaling 30,000 sq. ft. of floor space, and will remodel for new branch mechanical-bottling plant.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Feb. 14 for five centrifugal pumps (Circular 601), gilding metal housing, aluminum relay caps, aluminum retainers, etc. (Circular 564); until Feb. 15, 10 600-lb. steel fin assemblies, steel fabrications, for demolition bombs, 10 similar steel fabricated assemblies, 300-lb. each, for demolition bombs, 90 300-lb. and 90 600-lb. aluminum fabricated fin assemblies for demolition bombs (Circular 616); one sensitivity testing outfit (Circular 615).

Quartermaster Depot, Twenty-first and Johnston Streets, Philadelphia, asks bids until Feb. 16 for six 500-lb. portable electric lifters, double telescoping type, non-revolving base (Circular 669-170).

Synthane Corp., Highland Avenue, Oaks, Pa., manufacturer of plastics and composition products, has purchased a nine-acre tract fronting on Schylkill River, and will use part of site for expansion.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 21 for one motor-driven precision bench lathe for Philadelphia Navy Yard (Schedule 2792).

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Feb. 14 for contact plugs, contact sleeves, wire, etc. (Circular 674); until Feb. 15, special steel stockroom shelving (Circular 687).

Thomas A. Cashin, Inc., 418 Cherry Street, Philadelphia, manufacturer of machinery and parts, has leased space in building at 4060 Orchard Street for plant.

BUFFALO DISTRICT

American Bridge Co., 71 Broadway, New York, has filed plans for extensions in structural steel works at Elmira Heights, Elmira, N. Y., on adjoining property recently acquired. Work will include one-story units, with installation of traveling cranes and other mechanical-handling equipment. Cost about $100,000.

Kraft-Phenix Cheese Co., 400 North Rush Street, Chicago, has filed plans for one-story factory branch, storage and distributing plant at 138 Manitoba Street, Buffalo, with installation of tanks and other equipment. Cost close to $50,000.

WASHINGTON DIST.

Naval Supply Depot, Norfolk, Va., asks bids until Feb. 14 for two globe valve reseating outfits (Req. 4-1863); until Feb. 15, one steam vertical fire-tube boiler unit, without grates, fittings and smoke hood (Req. 27); until Feb. 16, 5-in. galvanized welded wrought iron pipe (Req. 173), brass welded chain (Req. 4-1845); until Feb. 17, three 5-gal. portable oil torches, suction type (Req. 4-1848).

Division of Purchases and Sales, Department of Commerce, Washington, asks bids until March 3 for 50 engine-generator plants, 18.75-kva., and 36 additional such plants, same capacity (Proposal 28985).

Anheuser-Busch, Inc., 721 Pestlozzi Street, St. Louis, brewer, plans one-story factory branch on Oakie Street, N.E., Washington, for bulk storage and distribution. Cost over $60,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 15 for 15,000 ft. of ½-in. galvanized wire rope, 32,000 ft. of wire rope, 1000 ft. of steel wire rope, 4000 lb. of galvanized steel seizing strand, 5000 lb. of galvanized barbed wire, 10,000 ft. of brass pipe, copper pipe, copper tubing, brass pipe, eight ½ to 3-ton chain hoists, 59,000 lb. of common steel wire nails, 5000 lb. of galvanized steel wire roofing nails, 400 lb. of copper cut nails, steel rails and other equipment (Schedule 3330).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 15 for steel bolts, nuts and lag screws (Schedule 2726), one box-type electric furnace (Schedule 2682), ball and roller bearings (Schedule 2763), one motor-driven exhauster-type blower (Schedule 2741), steel tanks (Schedule 2668); until Feb. 18, steel flanges (Schedule 2764) for Eastern and Western yards; until Feb. 15, 15-hp. induction motors, controllers and spare parts (Schedule 2793); until Feb. 18, one motor-driven, double-spindle, high-speed, vertical miller, fixtures and tools (Schedule 2742) for Washington yard; two automatic screw machines and equipment (Schedule 2563) for Alexandria, Va., yard.

NEW ENGLAND

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 15 for one motor-driven iron-working machine (Schedule 2769); until Feb. 18, 15,174 lb. copper-nickel alloy condenser tubing (Schedule 2797) for Boston Navy Yard.

Green Mountain Distillery, Inc., Burlington, Vt., plans expansion, including installation of large still and other equipment. Company is arranging financing in amount of $250,000, part of proceeds to be used for purpose noted.

Automatic Signal Corp., East Norwalk, Conn., manufacturer of traffic signals and signal systems, has acquired signal division of Tokeim Oil Tank & Pump Co., Fort Wayne, Ind., manufacturer of similar equipment and devices, and will consolidate. Division will be removed to plant at East Norwalk, where increased capacity will be arranged.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Feb. 23 for 10-kw. exciter unit (Circular 148); until March 2, one precision cutter relieving machine (Circular 149).

SOUTH ATLANTIC

United States Sugar Corp., Clewiston, Fla., plans expansion and improvements, including 2,000,000-gal. tank for molasses, processing equipment and other machinery. A development program at properties in Everglades also will be carried out. Fund of $500,000 has been arranged.

Supply Depot, Naval Air Station, Pensacola, Fla., asks bids until Feb. 16 for 12 two-ton chain hoists, 15 two-ton and 12 300-lb. plain trolleys (Req. 148-Aero-416), one drill grinder, one hardness testing machine, one squeeze-type riveter, one balancer suitable for suspending and balancing and lifting rivet squeeze complete, one motorized drive for engine lathe, one motor-driven precision-type bench lathe, one hand-operated arbor press, one electric valve refacer, three temperature regulators, one magnetic controller (Req. 148-Aero-417).

SOUTHWEST

Hygrade Water & Soda Co., 653 Tower Grove Avenue, St. Louis, has acquired a one-story building at Boyle Avenue and Papin Street, and will remodel for new mechanical-bottling works. Cost close to $40,000 with equipment.

City Commission, Miami, Okla., has authorized purchase of new diesel engine-generator unit and auxiliary equipment for municipal electric power station.

Southern Mill & Mfg. Co., 525 South Troost Street, Tulsa, Okla., will remodel building at location noted for a new brewery. Complete brew-house, tanks, bottling machinery and other equipment will be installed. Cost over $60,000 with machinery. W. H. and George S. Ahrens are heads. C. F. Koenig is company engineer.

Construction Service, Veterans' Administration, Washington, asks bids until March 1 for auxiliary boiler plant and safety control equipment for power house at institution at Muskogee, Okla.

Rogers Galvanizing Co., Tulsa, Okla., has let general contract to Tulsa Boiler & Machinery Corp., 2020 South Union Street, for one-story branch plant just outside of city limits of Houston, Tex., 50 x 200 ft. Cost over $45,000 with equipment.

Pepsi Cola Bottling Co., Abilene, Tex., has let general contract to H. L. Rice, 1602 College Drive, for new two-story mechanical-bottling plant at Thirteenth and Pine Streets, 74 x 82 ft. Cost close to $50,000 with equipment. Gaskill-McDaniel, Alexander Building, is architect.

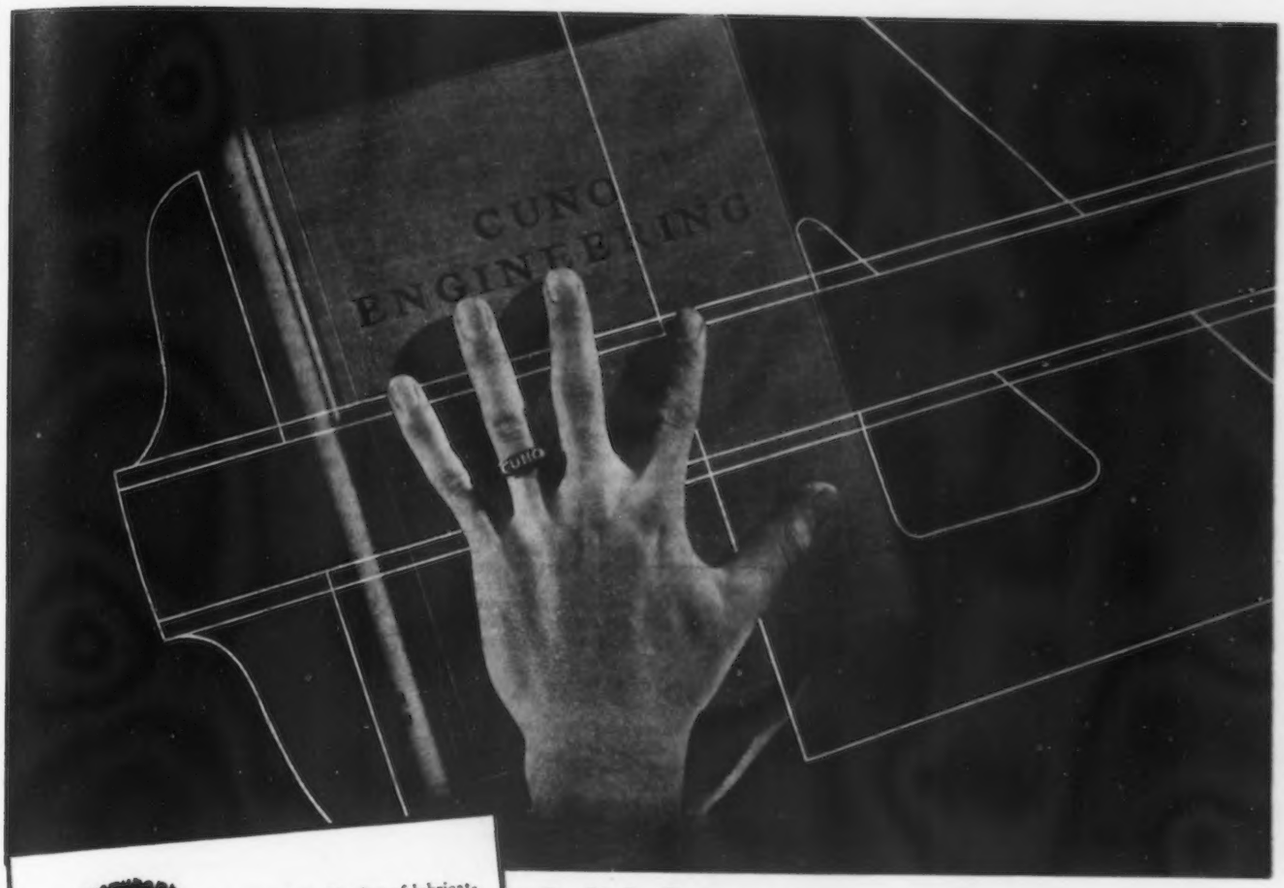
Port City Stockyards Co., Calhoun Road, Houston, Tex., meat packer, has plans for additions, comprising a two-story building and several one-story units. Cost over $65,000 with equipment.

City Council, Robstown, Tex., has been authorized to arrange bond issue of $350,000, of which $275,000 will be used for a new municipal electric power plant and system, and $75,000 for municipal gas distribution system. Garrett Engineering Co., Houston, Tex., is consulting engineer.

SOUTH CENTRAL

Southwestern Oil & Refining Co., Weber Building, Lake Charles, La., Harry E. Clark, president, recently organized, has leased about 45 acres fronting on Calcasieu Lake, for new oil refining plant, on which work will begin at once. Initial units will cost close to $100,000 with equipment. I. B. Chittenden is engineer and superintendent in charge of construction.

United States Engineer Office, Vicksburg, Miss., asks bids until Feb. 15 for 12 glands



To make the filtering of lubricating, cutting, or hydraulic oils *really* economical, many plants use a *giant* Cuno filter as a central filtering point for their oil — instead of many individual filters.

When we say we filter *all kinds* of fluids, we mean it. That includes air and gas. Taking moisture and dirt out of compressed air lines has saved many companies many dollars in equipment replacement costs. What about *your* company?

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How about protecting the delicate instruments in your plant — giving them longer life — giving you less maintenance cost? Very fine abrasives are efficiently stopped by Cuno filters. The coupon will bring you information.

Solid Geometry for Graduate Engineers

Geometrically speaking, Cuno filters are engineer-planned designs of "surfaces, lines, and angles," to *stop* solids. And they're *continuously cleanable.*

This work, branching into all industries, now embraces the straining of *all kinds* of fluids (including air and gases). Today, solids are being removed for more reasons than even we know . . . but it's reasonable to believe that — *whatever the reason* — industry saves money somewhere along the line by filtering. And with Cuno — there's no need for expensive duplex filters . . . no expensive shut-downs for cleaning.

There is a profitable filter application in your plant. *We* do not know it. But *you* might, if you sent us the coupon below. Meanwhile, the column at the left will give you an idea of Cuno applications.

Cuno's types of continuously cleanable filters — Auto-Klean and Flo-Klean have many sizes, strain two or three gallons per minute — or many thousand gallons. Made in any corrosion-resistant machinable metal, they operate over wide ranges of temperature, viscosity, and pressure; and they are all adaptable to special jobs. Our engineering service and laboratories are at your disposal, of course.

Cuno Engineering Corporation
380 South Vine Street
Meriden, Connecticut.
Please send me free bulletins on Cuno filters.
Name ..... State .....
Company ..... City .....
Street .....
☐ I'm interested in your engineering service.
(Check if you'd like information on this.)

call **CUNO** *your filtration engineers*

CUNO ENGINEERING CORPORATION ★ MERIDEN, CONNECTICUT

for 30-in. ball joint and one cast steel, 30-in. i.d., 30-deg. elbow (Circular 188); until Feb. 17, two cast steel basket cutters and one cast steel pump shell (Circular 191).

Royal Crown Cola Co., Inc., Memphis, Tenn., has acquired building at 327 Jefferson Street and will remodel for new mechanical-bottling plant. Cost close to $40,000 with equipment.

Board of Water and Light Commissioners, 65 McCall Street, Memphis, Tenn., Thomas H. Allen, chairman, asks bids until Feb. 16 for structures and equipment for new power substation E, for municipal distributing system (Contract 22), cost $126,000; until Feb. 23, electric meters (Contract 24), cost $56,000.

MICHIGAN DISTRICT

Saginaw Steering Gear Division, General Motors Corp., Saginaw, Mich., has plans for one-story addition, for which superstructure will begin in spring. Cost over $75,000 with equipment.

Norge Division, Borg-Warner Corp., 670 East Woodbridge Street, Detroit, manufacturer of electric refrigerators, electric ranges, washing machines, etc., plans expansion and improvements at plants at Muskegon Heights, Mich., and Detroit. At first noted plant a two-story addition will be built, totaling about 150,000 sq. ft. of floor space, adjoining stove works. Other expansion also will be carried out, with installation of equipment. Cost about $800,000 with machinery. At Detroit, company will expend close to $1,200,000 for new buildings and equipment. Harry L. Spencer is general manager at Muskegon Heights plant.

Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., has let general contract to Spence Brothers, Saginaw, for one-story addition. Cost about $50,000. Frantz & Spence, Saginaw, are architects.

WESTERN PA. DIST.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has let general contract to Parkman Construction Co., Inc., 1033 East Ohio Street, for one-story addition to plant on Wilkens Avenue, Baltimore, recently acquired for branch plant for radio equipment-manufacturing division, to be removed from Chicopee Falls, Mass., to that location. New unit will cost over $75,000 with equipment. Hunting-Davis & Dunnells, Century Building, Pittsburgh, are architects.

St. Joseph Lead Co., 250 Park Avenue, New York, has plans for extensions and improvements in plant at Josephtown, Pa., to include new loading and unloading docks with mechanical-handling equipment, power plant and other structures. Cost over $150,000 with equipment.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has let general contract to David T. Riffle, 1006 Forbes Street, Pittsburgh, for new bulk oil plant, including machine shop, at 5733 Butler Street, Pittsburgh. Cost over $50,000 with equipment.

OHIO AND INDIANA

United States Engineer Office, Louisville and Ohio River Division, Cincinnati, plans installation of pumping machinery, floodgates and hoists to cost about $1,200,000 in connection with dam, levee and floodgate construction in Ohio Valley, near Paducah, Ky., for which surveys are being made. Entire project will cost close to $5,400,000.

Crowell Publishing Co., Springfield, Ohio, plans multi-story addition to printing and publishing plant, for which work is scheduled to begin in spring. Cost close to $1,000,000 with equipment.

Antonio Palazzolo & Co., 712 Central Avenue, Cincinnati, manufacturers of food products, have plans for new six-story and basement plant, 100 x 100 ft., at 2009 Gilbert Avenue, with foundations to provide for two additional floors later. Part of structure will be used for bulk storage and distribution. Cost over $125,000 with equipment. Carlton, Frankenberger & Batson, 4122 Davis Lane, are architects.

Timken Foundation, Canton, Ohio, has plans for new multi-unit technical and vocational school, for which bids will be asked on general contract in spring. Cost about $1,000,000. Charles E. Firestone, 1342 Cleveland Avenue, Canton, is architect.

Contracting Officer, Aircraft Radio Laboratory, Wright Field, Dayton, Ohio, asks bids until Feb. 14 for motor-driven drill presses, three sanding drums, one spray gun complete, saw blades, etc. (Circular 15 ARL).

Contracting Officer, Materiel Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Feb. 15 for camshaft drive pinion, camshaft gear, exhaust, discharge and intake valves, exhaust and discharge valve seats, etc. (Circular 667); until Feb. 17, 130 hollow rivet keyway cutters, 130 hollow rivet setting headers and 1572 hollow rivet header mandrels (Circular 655), 4700 single-contact socket assemblies (Circular 654), spring joint dividers and screw pitch gages (Circular 653); until Feb. 21, interlocking fasteners, slider and pull, bottom stop, top stop, and fastener assemblies (Circular 658); 350,000 palnuts (Circular 670).

Stokely Brothers & Co., 2002 South East Street, Indianapolis, manufacturers of canned food products, plan rebuilding of branch plant at Tipton, Ind., recently destroyed by fire. Loss over $400,000 with equipment. Philip Smith is plant manager at Tipton.

MIDDLE WEST

Standard Transformer Corp., 850 West Blackhawk Street, Chicago, has filed plans for one and two-story addition, 25 x 75 ft., for which general contract recently was let to C. A. Klooster, 109 North Dearborn Street. Cost about $45,000 with equipment. Alexander & Brandt, 22 West Monroe Street, are architects.

City Council, Glenwood, Minn., has plans for new municipal electric light and power plant, and electrical distributing system. A special election is being arranged to vote bonds for $200,000. Cost about $268,000, remainder of fund to be secured through Federal aid. Burlingame, Hitchcock & Estabrook, Sexton Building, Minneapolis, Minn., are consulting engineers.

United States Engineer Office, Rock Island, Ill., asks bids until Feb. 15 for 20-in. ball joints (Circular 193).

United States Engineer Office, Fort Peck, Mont., asks bids until Feb. 14 for two 2½-cu. yd. electric-operated shovels for handling heavy riprap stone (Circular 210), two standard gage used oil-burning steam locomotives (Circular 211).

Bureau of Reclamation, Denver, asks bids until Feb. 16 for two 10-cu. ft. concrete mixing machines (Proposal 28013-D); until Feb. 18, one steel batcher plant for concrete aggregates, consisting of a 110-ton, three-compartment, tandem spaced storage bin and one three-compartment weighing hopper having a capacity not less than one cu. yd., and equipped with one 3000-lb. springless visible dial scale, complete (Proposal 28013-B).

Wisconsin Highway Commission, Madison, Wis., will close bids Feb. 18 for new highway laboratory, service building and road sign fabricating shop, for which Legislature has appropriated $175,000. E. L. Roettiger is State highway engineer.

Richland Center, Wis., City Council will be ready for bids after Feb. 15 for municipal light plant improvements to cost $110,000 and including installation of new 2500-kw. turbine. H. C. Carroll, 307 North Michigan Avenue, Chicago, is consulting engineer.

Simplex, Inc., Beaver Dam, Wis., has been incorporated by H. L. Kirsh, formerly general manager of the defunct Western Malleables, Inc., local, and associates to take over foundry and machine shop of former F. Rassmann Mfg. Co., and do jobbing business in malleable and gray iron castings.

State of Michigan, Lansing, Mich., has engaged Derrick Hubert, architect, Menominee, Mich., to design new $230,000 power plant for State institutions at Newberry, Mich. E. R. Little Co., Inc., Detroit, is consulting engineer.

Menominee, Mich., City Council is proceeding with proposed $880,000 municipal light and power plant, in litigation since PWA funds were allotted in 1934. Preliminary engineering work was done by Francis Engineering Co., Saginaw, Mich. B. W. Delgoffe is city clerk.

PACIFIC COAST

General Petroleum Corp., 108 West Second Street, Los Angeles, has taken out five permits for expansion and improvements in oil refinery at Torrance, comprising a new unit with two 5400-bbl. oil tanks, viscosity breaker, cooling tower, bubble tower, control house, tank units, heat exchanger, heater stack and other facilities, to cost $1,300,000 with equipment; three 80,000-bbl. steel tanks near present main buildings of company tank farm on Crenshaw Avenue; one 30,000-bbl. tank near waste separator and sump; also new water storage tank, boiler units and accessories, pumping station, switch house and other structures. Entire project will cost $1,730,000.

Cal-Juice, Inc., a subsidiary of Mutual Orange Distributers, 514 East Eighth Street, Los Angeles, has authorized plans for new citrus fruit by-products plant at Anaheim, Cal., comprising a main two-story unit, 100 x 200 ft., and one-story structure adjoining, 60 x 100 ft. A mechanical-cooling system will be installed. Cost over $80,000 with equipment. M. Eugene Durfee, 420 Orange Avenue, Long Beach, Cal., is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 15 for one light-type, motor-driven universal milling machine and spare parts (Schedule 2736) for Mare Island Navy Yard; one 9-in. motor-driven precision lathe, tool room type (Schedule 2735) for Keyport, Wash., yard; until Feb. 25, one motor-driven drill press (Schedule 2795) for San Pedro, Los Angeles, Naval Air Station.

Wasatch Oil & Refining Co., Salt Lake City, Utah, has plans for new oil refinery at Pocatello, Idaho, with division for gasoline production. A steel tank storage and distributing department will be installed, boiler plant and pumping station. Cost about $80,000 with equipment.

FOREIGN

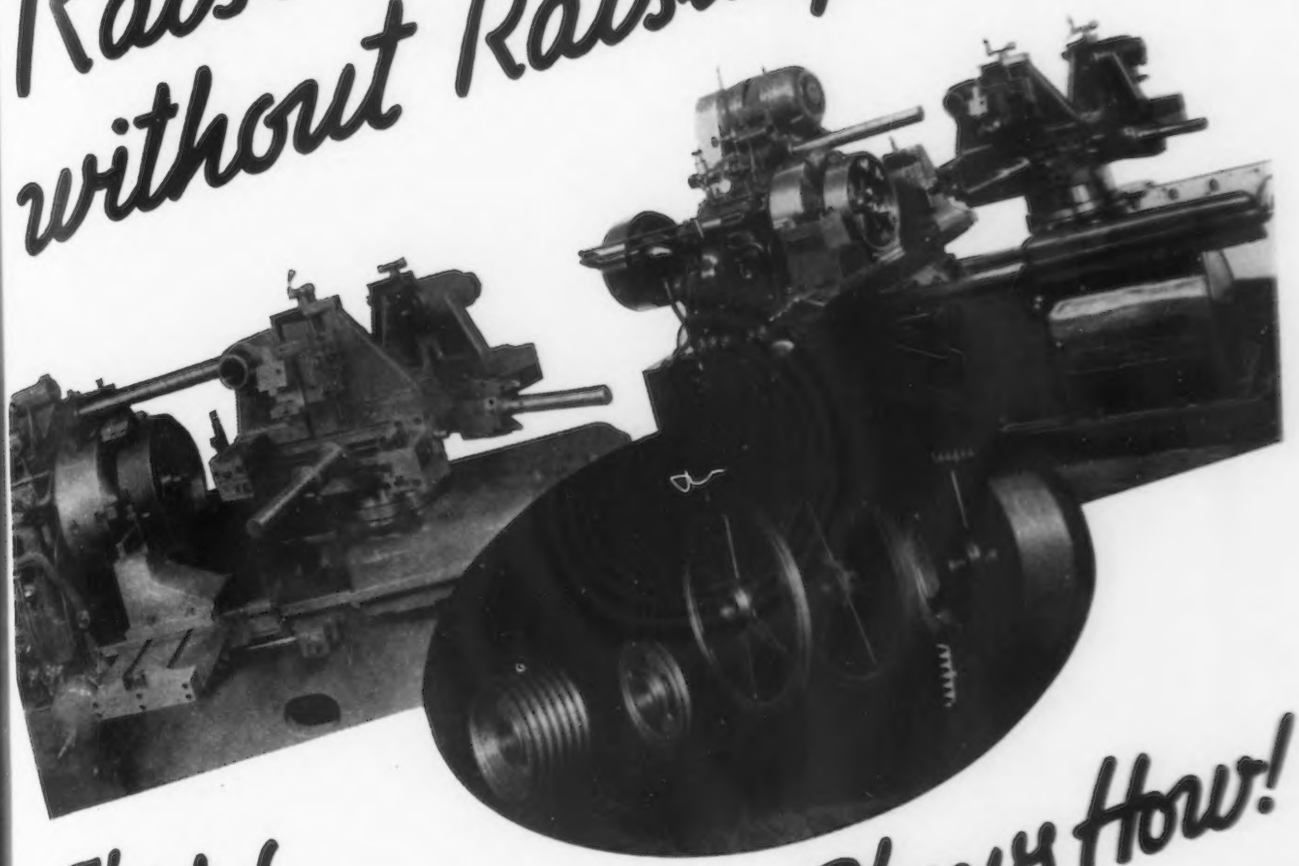
St. Maurice Power Corp., Montreal, joint subsidiary of Brown Corp., Quebec, operating a pulp and paper mill at La Tuque, Que., and Shawinigan Water & Power Co., Montreal, plans new hydroelectric generating plant near La Tuque, primarily for power service at mill noted, with excess power to be used by Shawinigan company. Project includes large power dam, generating station of 162,000-hp. rating, divided into four hydraulic turbine units of 40,500-hp. each, transmission line to paper mill, power substations and switching stations, and other facilities. Cost about $12,500,000.

British Aluminum Co., Ltd., London, England, has approved plans for new works at Newport, Wales. Cost over $800,000 with equipment.

Austin Motor Co., Ltd., Birmingham, England, small motor cars and parts, has plans for several one-story additions, totaling about 200,000 sq. ft. of floor space, for expansion in parts production and assembling divisions. Cost close to $1,000,000 with equipment.

Federal Electrical Commission, Mexico, D.F., plans new hydroelectric generating plant at Ixapantongo, Rio Bravo Valley district, with initial capacity of 15,000-hp. Project will include transmission lines, power substations and switching stations for service at Mexico City and vicinity. Cost about $1,900,000 exclusive of power dam. Two hydroelectric power stations will be built later in same district to develop an additional 65,000-hp., to cost about $5,000,000 with transmission lines and distribution facilities and exclusive of power dams. Considerable equipment will be purchased in United States. Senor Lic. Eduardo Suarez, secretary of Treasury Department, Mexico, D.F., will be in charge of purchases.

Raise Wages without Raising Prices?



The New P & J Automatic Shows How!

Several sizes and types of **light-section** cast iron grooved pulleys. Machining them quicker within close run-out tolerances is one way this new 6-DRE Automatic Chucking and Turning Machine lowers production costs.

Quantity? Doesn't matter much because due to simple and accessible tooling this Automatic competes with hand machines even on comparatively small lots. Large quantities show larger savings!

The biggest pulley is 18.75" OD x 4 3/4" face width, and has 6 grooves. Chucking on the OD the roughing operations are bore, turn OD to jaws, face rim, bore rim, form 19° angle on rim, face hub. Next reverse and rechuck pulley on OD for roughing the opposite half. Both roughing operations performed during one index of the turret. Floor to floor time is 11.10 minutes.

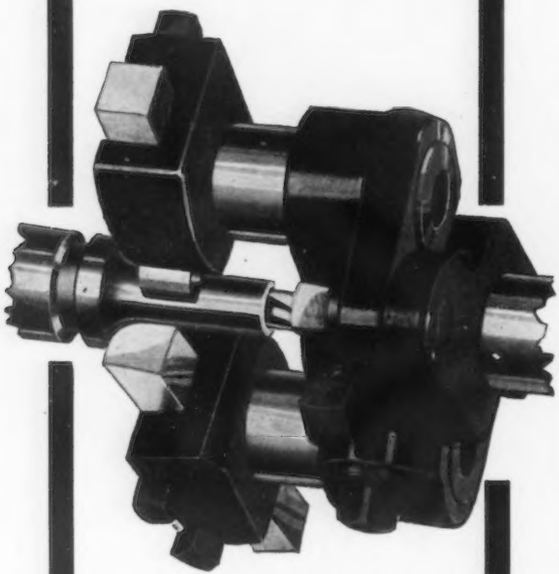
Second tool set-up chucks on the ID. Operations are finish turn OD; rough and finish grooves and straddle-face rim with front and rear gang tools; finish bore; and ream. Floor to floor time 8.42 minutes.

Ask for a P & J estimate on **your** work.

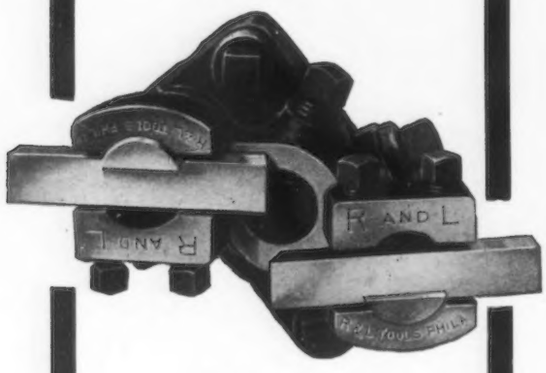
Potter & Johnston Machine Co.
Pawtucket R.I.

Naturally...

THREE TOOLS WORK FASTER THAN ONE



Turned part with large radius and drilling. Back Rest set to support work over straight turned diameter



Used as a Balanced Turning Tool either Right Hand or Left Hand

On this principle R & L Combination Tools were designed. They are our answer to the demand of producers of machined parts for more production —greater efficiency—lower cost. Special construction permits quick and easy adaption for use as a single, double or triple tool on all types of single and multiple spindle machines. R & L Tools replace many expensive tools.

Any R & L is a real Houdini for speed and quick set-up. In 10 seconds you can make it a right or left hand tool—an exclusive feature. The backrest which takes the tool thrust is surfaced with tantalum carbide and burnishes the work surface.

In hundreds of shops, R & L Tools have reduced production time one-half to two-thirds on many jobs. New users are learning daily, in their own shops, of the wide range and great efficiency of R & L Tools on their own work. What they are doing for others, they will do for you.

Now you can try one without cost in your shop, and judge its value and merit. Get our booklet of data, select the size of R & L Tool for your type of work, and we will send it on a FREE TRIAL PERIOD. If it does a better job, send us your check.

R AND L TOOLS

1815 BRISTOL STREET
NICETOWN
PHILADELPHIA, PA.

Send me the booklet describing the R and L Combination Turning Tool!

COMPANY NAME .....

INDIVIDUAL NAME .....

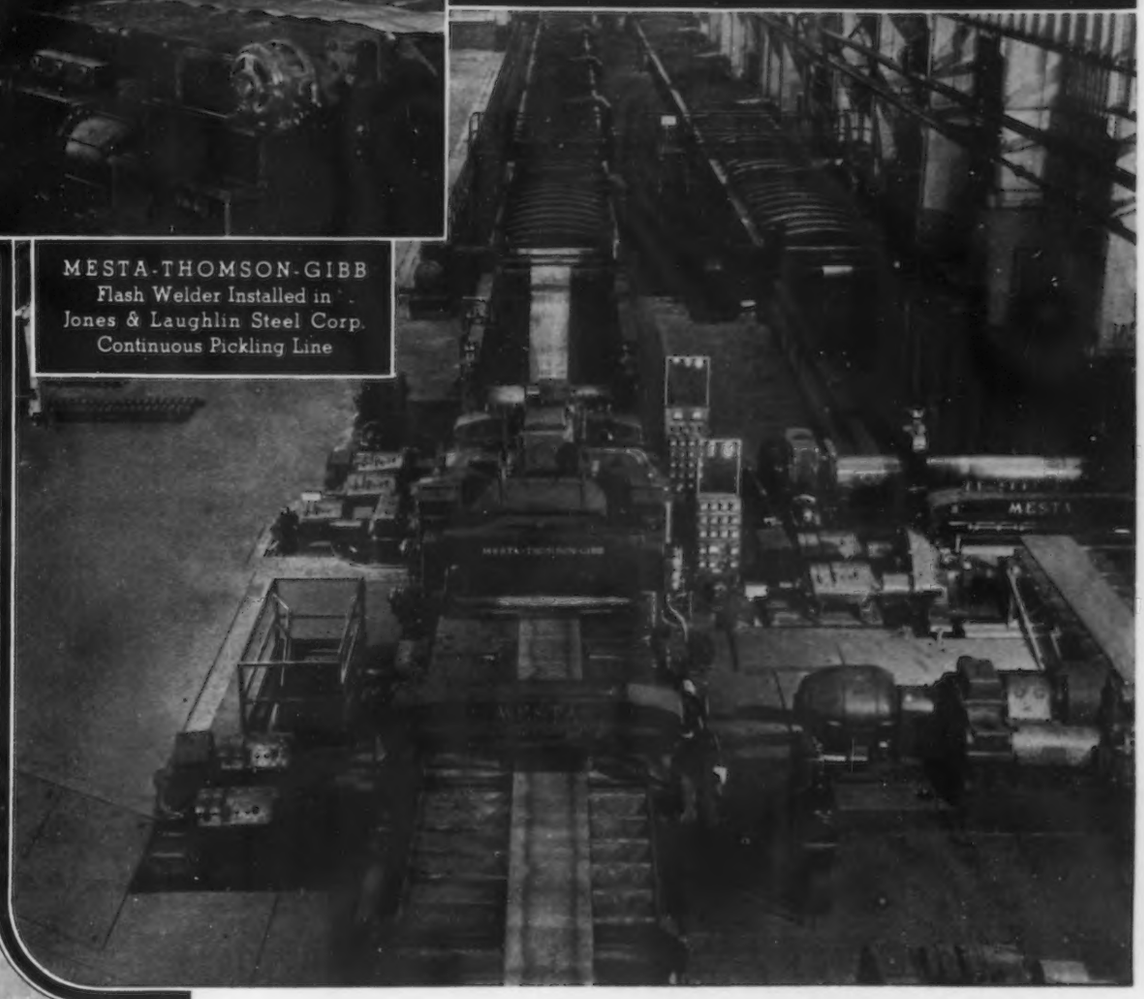
STREET .....

CITY .....

R AND L TOOLS
Nicetown, Philadelphia, Pa.

BUTT WELDING STRIP STEEL

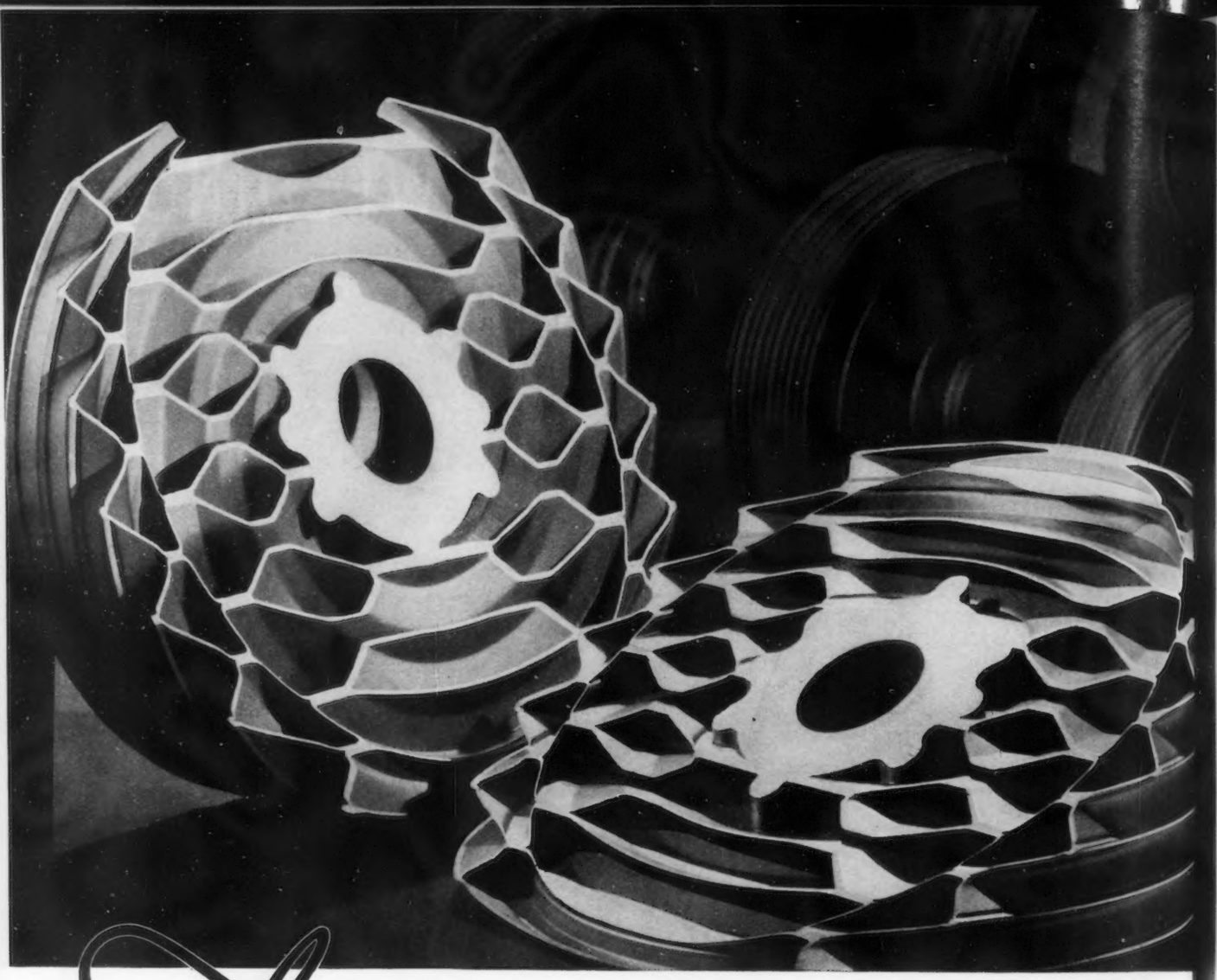
MESTA-THOMSON-GIBB
Flash Welder Installed in
Jones & Laughlin Steel Corp.
Continuous Pickling Line



- The MESTA-THOMSON-GIBB Flash Welder produces a butt weld which can be cold rolled.

Cold mill production is increased and larger continuous coils are obtained.

MESTA MACHINE COMPANY · PITTSBURGH



The inside story . .

THIS illustration tells the inside story of Duro-Brace Texsteel Sheaves.

Lightness (in order to reduce bearing pressures to a minimum) is highly desirable in a sheave, but none of its strength may be sacrificed to this end.

Allis-Chalmers engineers set about this seemingly contradictory problem and solved it by designing an interior grid-type of construction, which gives the strength and rigidity of cast iron with the lightness of pressed steel, and a smartness in appearance that adds distinction to any machines equipped with them.

In this design the outside walls of the sheave a also reinforced by convex steel plates, which greatly increase their strength as to eliminate di tortion even under the severest duty. The result is light, true-running, vibrationless drive always.

Duro-Brace Texrope Drives are silent, 98.9% ef cient, slipless, shock-absorbing, require no belt dressi or lubrication, and are not affected by dirt or moistur

Write us for Bulletin No. 2188, which sets forth th advantages that Duro-Brace Texsteel Drives offer yo in all matters of power transmission.

Belts by Goodrich

TEXROPE DIVISION

ALLIS·CHALMERS

THE COMPLETE SPRAY-PAINTING & FINISHING SYSTEM

Modern methods of production finishing require the exhaust of vapors and the ventilation of the finishing area. Included in the comprehensive DeVilbiss System, is a complete line of exhaust equipment for use with any finishing material, in any finishing operation.

From a small stamping to a locomotive, DeVilbiss Exhaust Equipment accommodates objects small and large in any form or shape. The many different types of DeVilbiss Exhaust Equipment include: the simple direct type of exhaust, the indirect type, the downdraft type, the dry reclaiming type, the water wash type, the canopy type. The complete DeVilbiss System also includes every other item of equipment required in the spray process of paint application — air compressors, material containers, regulators, hose, hose connections, spray guns and all accessories. For all production finishing and maintenance painting, the broad DeVilbiss line holds the answer to greater efficiency and lower costs.

If your problem is so highly specialized that it cannot be met by standard DeVilbiss Equipment, our engineers will plan an installation to meet your individual requirements.

The DeVilbiss Company, Toledo, Ohio.

SPRAY GUNS

MATERIAL CONTAINERS

REGULATORS

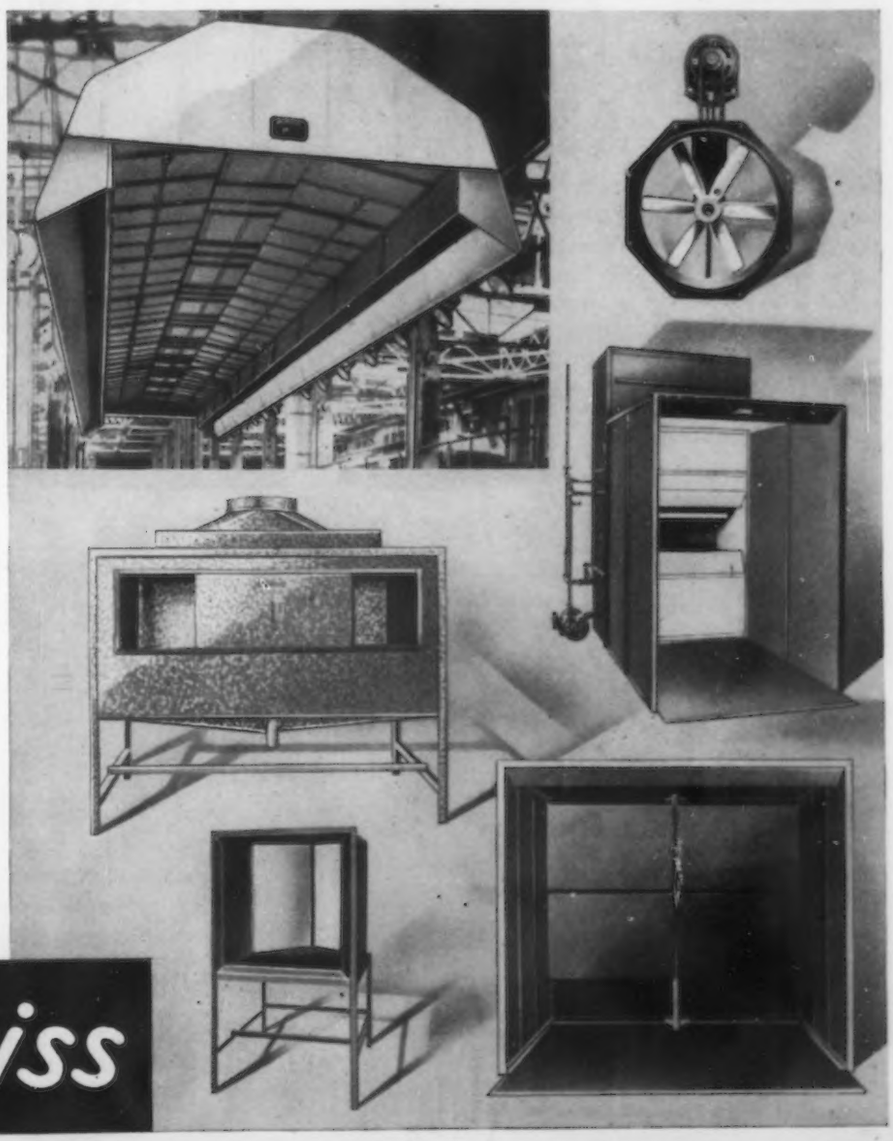
SPRAY BOOTHS

EXHAUST FANS

HOSE AND CONNECTIONS

AIR COMPRESSORS

ACCESSORIES



DeVilbiss

Quick Action

IN HEAVY-DUTY METAL CLEANING

ORTHOSIL

TRADE MARK

The speed with which Orthosil solutions cut through grease and dirt and lay clean the metal underneath has brought this revolutionary product quick acceptance.

With Orthosil, the grease and dirt are held in suspension and prevented from re-depositing on the bright, clean metal. Being better conductors of electricity than most other alkaline salts in similar concentrations, Orthosil solutions offer exceptional efficiency in electrolytic cleaning.

A dry, white powder unhampered by inert salts and by relatively weak alkaline diluents, Orthosil is easily handled and convenient to store. Try Orthosil — check it against other alkalis. Write for full details. Address Department E.

PENNSYLVANIA SALT *Chemicals*

Particularly effective in electrolytic cleaning due to its high conductivity.

Assures quicker action than other alkalis.

Prevents grease and dirt from re-depositing.

Easy to pour, quick to dissolve.

Dry—highly concentrated—economical.

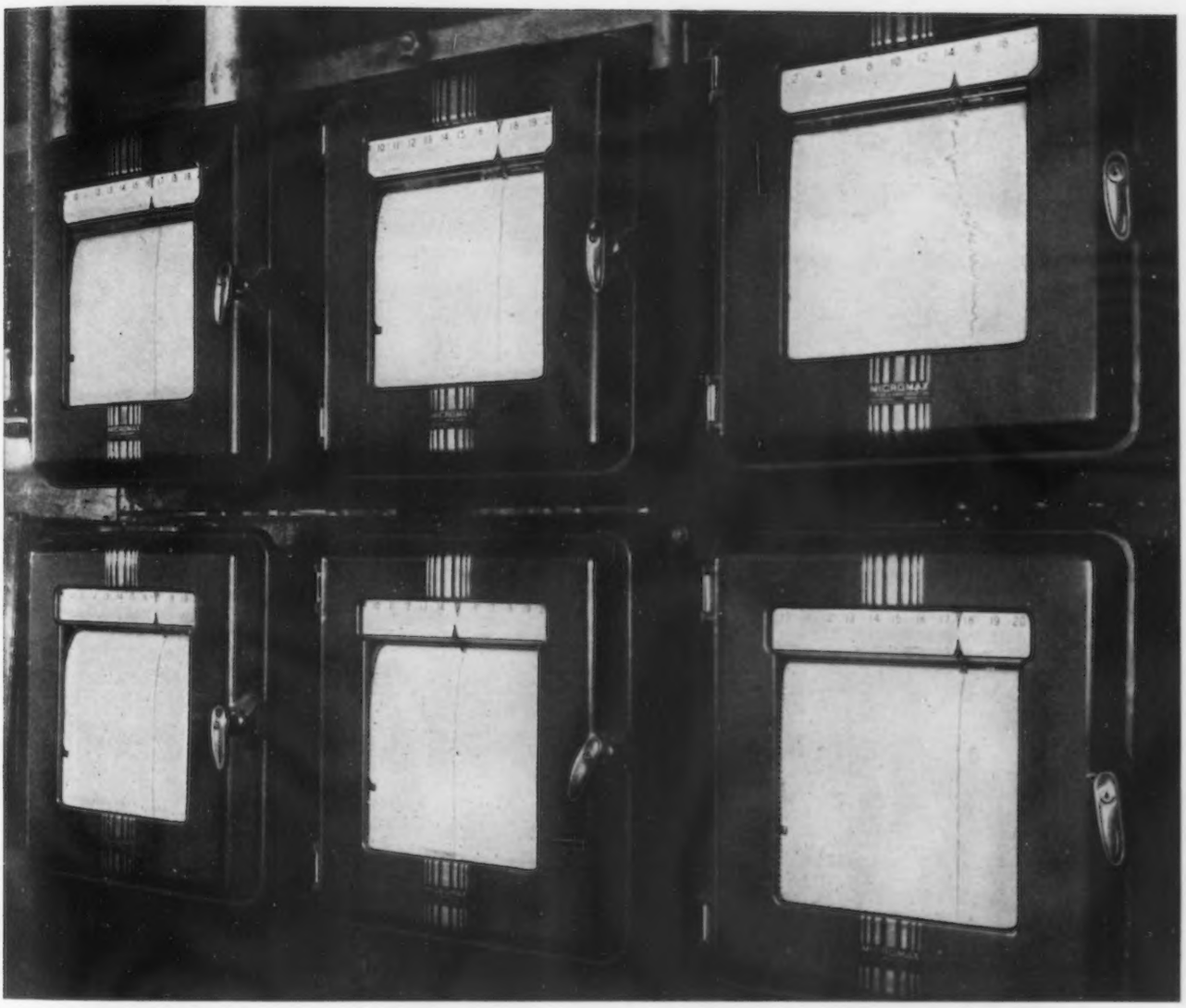
Quickly removes the grease, soot, dust, and various other kinds of dirt unaffected by pickling acid.

Leaves material *clean* for further processing.

PENNSYLVANIA SALT MANUFACTURING COMPANY · Est. 1850

WIDENER BLDG., PHILADELPHIA, PA.

New York · Chicago · St. Louis · Pittsburgh · Tacoma · Wyandotte



Temperatures in large Industrial Furnaces are Controlled by these Micromax Pyrometers.

Micro ACTION OF MICROMAX

Lessens the Swings in TEMPERATURE CONTROL

Not abruptly, but smoothly; not in fixed steps, but gliding — is the way industrial temperatures move when they start up or down. And the "heading-off" action of the highly responsive Micromax Pyrometer is similar, because there is no fixed amount by which temperature must change before Micromax energizes the control valve.

As temperature begins to edge away from the desired point, it is matched by a series of micro-motions of the balancing mechanism, each initiating its own control effect, the extent of which depends on the actual position of the instrument's pointer. If the temperature swing is unchecked, the mechanism extends its steps, exerting correspondingly greater effect on the valve, but the unique response to tiny changes is the essence of precise control.

This responsiveness is precisely what the modern proportioning control mechanism needs to maintain closest regulation. Any control is a better control when it includes a Micromax Pyrometer.

Catalogs On Request

LEEDS & NORTHRUP COMPANY, 4956 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

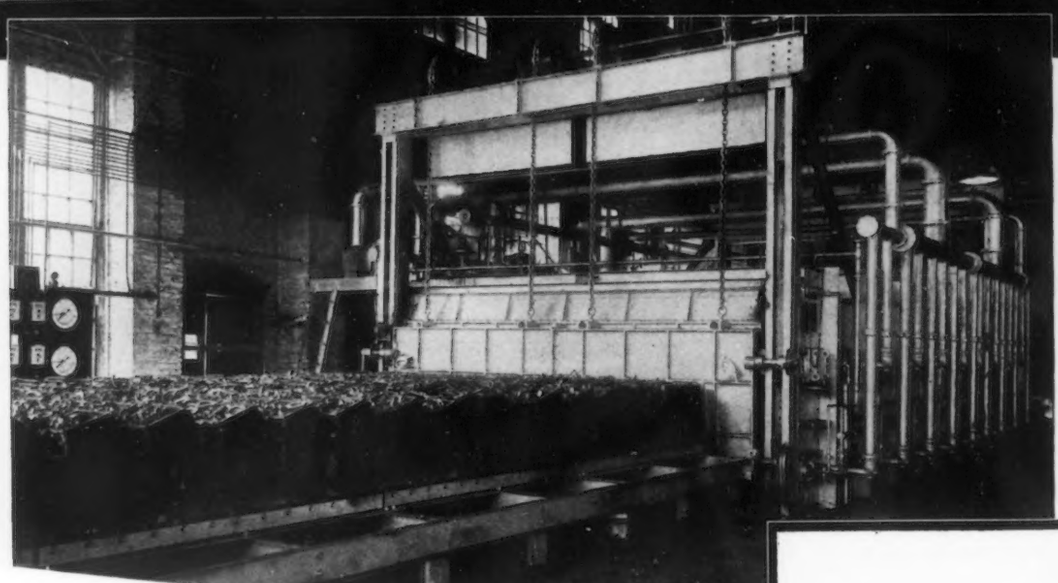
J-2033(16)

BECAUSE

"IT SHORTENS HEATING-UP TIME AND SAVES DELAYS"

THE TREND TODAY IS TO GAS

FOR ALL INDUSTRIAL HEATING



Recent improvements in industrial Gas equipment make this preferred fuel even more economical and efficient. Up-to-date Gas applications provide quick heating, a uniformity in heat distribution, and an automatic accuracy of control that make for lower production costs regardless of the size of either plant or job.

Cleanest of all fuels, and the highest in utilization value, Gas also is instantly available in unlimited supply, thus offering unmatched *natural* advantages which speed production, lessen shut-downs, reduce spoilage and bring appreciable savings in the manufacture of your products.

Let an industrial engineer from your gas company demonstrate how modern Gas equipment, properly installed, cuts over-all costs and puts production on a more profitable basis.

THERE'S NOTHING LIKE **GAS** FOR

HARDENING CARBURIZING
ANNEALING FORGING
TEMPERING GALVANIZING
NORMALIZING CORE BAKING
BLUEING MALLEABLIZING
NITRIDING
AND MANY OTHER
INDUSTRIAL PROCESSES

AMERICAN GAS ASSOCIATION

INDUSTRIAL GAS SECTION: 420 LEXINGTON AVE., NEW YORK

THE user-reports printed opposite are typical of a large number that have come in. What they all boil down to is this: Tellurium Lead is establishing itself as an "extra-service" lead—as a product of sound merit with the capacity to give longer service in many applications requiring the handling of corrosive liquors and gases.

Manufacturers in a position to know report that this lead gives increased resistance to sulphuric and other corrosive acids, even at temperatures that tend to approach the melting point of the metal. In plant after plant, it has prolonged the useful life of equipment...and reduced the number of shut-downs for repairs.

Another highly important property of Tellurium Lead is this: *It toughens under stress.* When rolled, stretched or hammered, it actually becomes stronger. As a result, turn-over points and joints are less subject to cracking. Furthermore, where vibration occurs, this capacity to develop latent strength minimizes buckling and creeping. This same quality also gives Tellurium Lead improved resistance to fracture due to repeated heat changes.

Tellurium Lead of our manufacture is St. Joe chemical lead alloyed with a small quantity of tellurium. It gives the advantages of this well-known chemical lead plus important new ones. Yet now, due to a price reduction, it costs only a fraction of a cent more per pound than chemical lead. Available in sheets, pipe and coils. For further facts, write to nearest branch.

★ "4 TO 5 TIMES LONGER SERVICE"

"1¼" x 6 lbs. Tellurium Lead coil is used in a bath of 10 to 20% sulphuric acid and water with a steam pressure of 5 to 15 lbs. and a temperature of 170° F. It replaced an open jet steam system which oxidized badly at the acid level. Tellurium Lead has not shown any signs of this action after four or five times the length of service of lead formerly used."

A leading manufacturer writes:

"I wish to say that your Tellurium Lead pipe has proven all you claimed. It is easy to weld and easy to flange. Also the flanges stand up a good deal better than ordinary lead as they seem to actually become stronger at the turn-over point."

"DOUBLE LIFE"

—reports this user

"Tellurium Lead coils used in a dilute sulphuric acid solution. The lead coils previously used gave comparatively short service (about 6 months). Tellurium Lead coils have been operating continuously 24 hours a day for one year and as yet no blow-outs have occurred nor have any repairs been necessary."

Expressing his complete satisfaction with Tellurium Lead, another manufacturer writes: "We can say that for the last two years we have purchased all our lead requirements in Tellurium Lead, since we find a considerable advantage in its stiffness and resistance to vibration crystallization. This lead has been used for pipe lines, tank linings and various acid-plant fittings, and we feel that it is well worth its additional cost."

No Twisting or Bulging...

A chemical plant used 2½" x 14 lb. Tellurium Lead pipe in a pump line carrying alum liquor. Former pipe twisted and bulged after three months' service. Tellurium Lead has been in service three years and is still performing satisfactorily.

New Low Price Now in Effect!

• • •

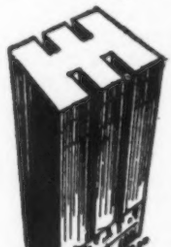
NATIONAL LEAD COMPANY

New York, Baltimore, Buffalo, Chicago, Cleveland, Cincinnati, St. Louis; National-Boston Lead Co., Boston; John T. Lewis & Bros. Co., Philadelphia; National Lead & Oil Co., Pittsburgh; Georgia Lead Works, Atlanta; Gibson & Price Co., Cleveland; American Lead Corporation, Indianapolis; Master Metals, Inc., Cleveland; The Canada Metal Company, Ltd., Toronto, Montreal, Winnipeg, Vancouver.

HEADQUARTERS FOR SUCCESS

Successful business men appreciate the need for modern comfort and convenience when they travel. And so, almost invariably, they stop at The Benjamin Franklin when in Philadelphia.

● For The Benjamin Franklin is Philadelphia's modern and convenient hotel. 1200 big comfortable rooms. Food that tempts the most travel-harassed appetite. Service that soothes travel-jarred nerves. You will find our rates very economically scaled. ● Try The Benjamin Franklin yourself the next time!



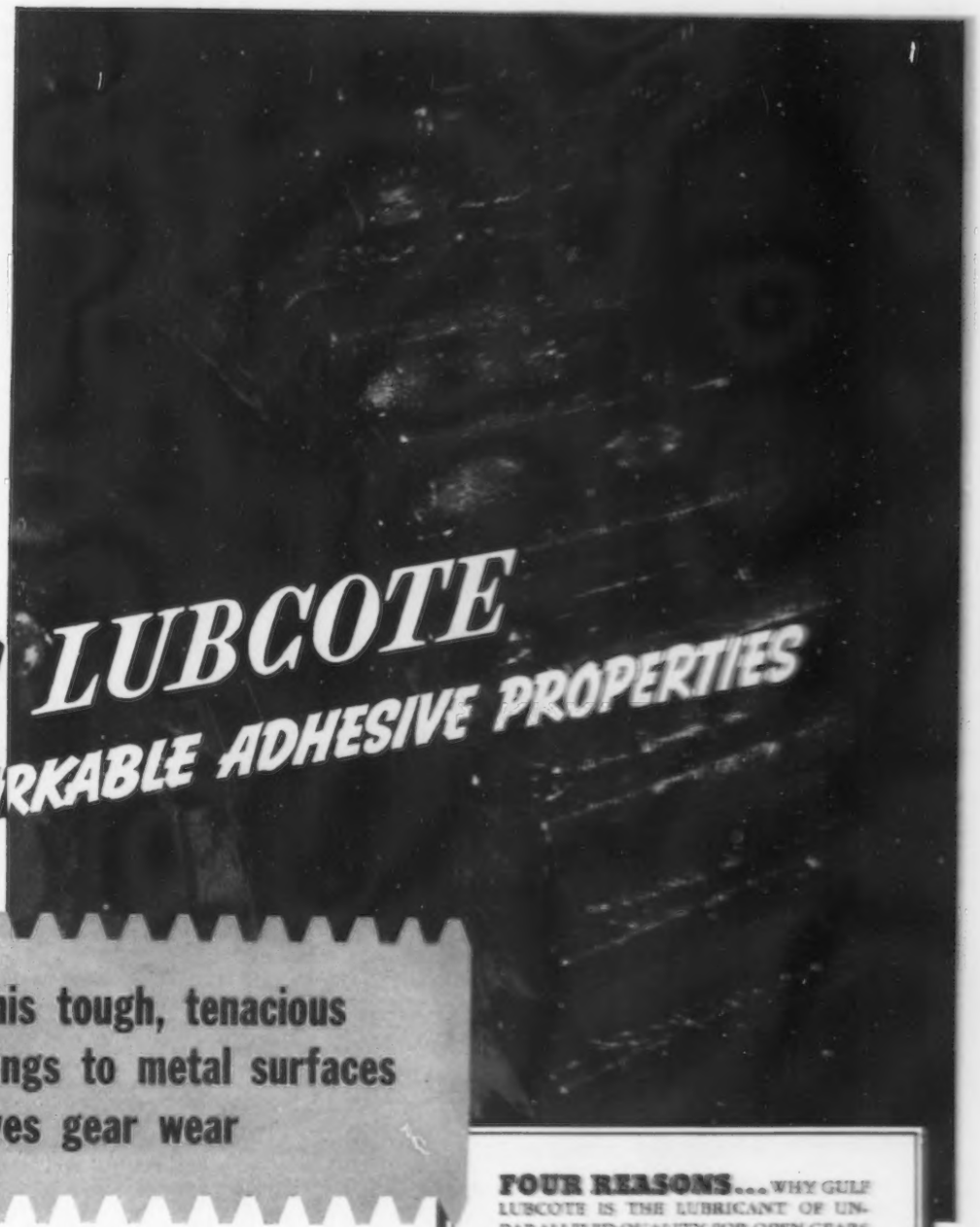
THE

BENJAMIN FRANKLIN

Philadelphia's Foremost Hotel

SAMUEL EARLEY, *Managing Director*

PHILADELPHIA



GULF LUBCOTE
HAS REMARKABLE ADHESIVE PROPERTIES

This tough, tenacious lubricant clings to metal surfaces . . . saves gear wear

GULF Lubcote has given a new meaning to the words "gear lubrication" to hundreds of plant operators from Maine to Texas.

Here is a *modern* gear lubricant — a special petroleum product which combines exceptionally high adhesiveness for metal surfaces with natural high viscosity and efficient lubricating qualities.

This heavy-bodied lubricant resists the wiping action of gears in motion, resists heat and decomposition and retains its original fluidity and high lubricating qualities for longer periods of time.

Gulf Lubcote is made in seven grades to fit various gear types, open or enclosed, and to provide for a wide range of operating conditions. Use it to lengthen the life of your gear trains and keep them operating without noise.

FOUR REASONS... WHY GULF LUBCOTE IS THE LUBRICANT OF UNPARALLELED QUALITY FOR OPEN GEARS

1 GULF LUBCOTES are heavy bodied products especially manufactured to have the requisite property of high adhesiveness for metal surfaces necessary in lubricants for open gears.

2 Due to selected crudes used and to the process of refinement employed, GULF LUBCOTES possess unusual lubricating qualities together with the essential property of flowing with the movement of the gear and pinion teeth.

3 The lubricating film provided by GULF LUBCOTES, in addition to being impervious to moisture, acid fumes and gases, will withstand extreme temperature changes without deterioration.

4 Due to the tough and tenacious nature of GULF LUBCOTES they will effectively reduce objectionable gear noise and at the same time will provide maximum protection against corrosion, pitting or excessive wear of the gear teeth.

GULF OIL CORPORATION
GULF REFINING COMPANY
GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

GULF INDUSTRIAL LUBRICATION

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34" VERTICAL BORING MILLS

Efficiency at Low Investment

ROGERS MACHINE WORKS

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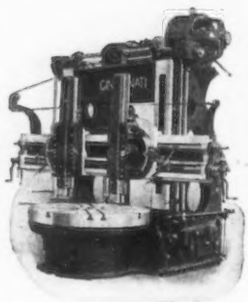

VERTICAL BORING MILLS

PLANERS
Double Housing
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THE CINCINNATI PLANER CO.
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...MEN IN THE MAJOR LEAGUES

Those men every community regards as leaders . . . in turn demand similar superior performance. In Chicago these men find at The Stevens the atmosphere . . . the comfort they demand of a hotel. That's the reason they call The Stevens, "America's Grand Hotel." Their strongest endorsements are their repeated autographs on our register.

OTTO K. EITEL, *Managing Director*

Room, with Bath, from $3

JUST BETWEEN US TWO

Literary Effort Lays English Egg

ENTIRELY barren of poetic gifts, we hold in awe those who can make lines scan and rhyme even feebly. But awed as we not at all by Emperor Hirohito's entry in Japan's annual imperial poetry contest:

"Peaceful is morning in the shrine garden;
World conditions, it is hoped, will also be peaceful."

The second line strikes a new lyric low. Even as prose you could hardly give it more than a D. But one of the highbrows in the Editorial Department, who is up on such things, tells us that Japanese poetry is like that.

So Hirohito's contribution may be hot stuff in the original Japanese, although in English it is enough to make Euterpe kick her typewriter in a vital spot.

Baltimore Oriole Chirps Sweetly

McC., who writes us anonymously from Baltimore too often, encircles our statement, *"804 out of every thousand Iron Age readers say 'Send it again,'"* and asks if we meant readers or subscribers.

We meant subscribers. We use the words synonymously, which is incorrect, for a subscriber represents an average of 5.25 readers. In addition, we exaggerated. The correct proportion is 803.8 out of every thousand. Sorry.

Then Sourly

DISGUSTED with himself for giving us an opportunity to brag about the high average of readers per copy, McC. steps back into character by observing nastily:

"The chances are that the manufacturer who took the Annual to Florida on his vacation did it because he wanted the help to do some work while he was away."

He ends up with picking a fight with the other anonymity, S. W. of Chicago, who wrote recently, *"Capitalism doesn't live up to its promises."* McC. asks, *"What is Capitalism and what has it promised?"* You tackle him, S. W., but look out for that left.

One Motor, With Four-Wheel Brakes

SAYS Carl Crow in his admirable, "400 Million Customers":

"Advertising conferences, like committee meetings, have a tendency to reduce each individual to the lowest common denominator of intelligence. The more people there are at the conference, the more difficult it is to accomplish anything."

The first phrase is unnecessarily restrictive. Charles F. Kettering went the whole hog in his much quoted:

"If you want to kill any idea in the world today, get a committee working on it."

Don't Say It

IN a prescient moment last September we headed an item *"Charley McCarthy Goes West."*

Since Mae's recent flight from Eden and the NBC network even the technical societies are censoring their scripts more carefully. Just recently the head of one of the big ones had this in his prepared address:

"The following comes from . . . . . , a publication as outstanding in its field as The Iron Age is in ours."

It was blue penciled.

They Don't Say

THAT trick photograph of machine vibration the Goodrich people ran recently in the ad headed, *"The Goodrich Cure for the Heebie-Jeebies,"* was so striking that we asked the man who prepared it how it was made. We are still dying to know.

Then our letter to *Time*, requesting that it swallow its words about having more advertising in 1937 than any other magazine, created no more excitement than St. Patrick's Day in Ulster. Maybe the *Time* people are going to let time, the great healer, salve our injured feelings unassisted. Or maybe they are so embarrassed about making the same mistake two or three years in a row that they don't know what to say.

Men Have Gone to War for Less

WILCOX-RICH makes a hard-facing material called *Xaloy*. Purists will pronounce it *zal-oy*—X as in *Xavier, Xerxes, xylophone, xerophthalmia, xylology, xiphoid, etc.* Impurists will probably hit it right on the nose the first time and call it ex-aloy, which is probably how the maker wishes it pronounced.

This will give the high-domers an inferiority complex, build up complexes, break up friendships, and lead to gawdknowswhat. To prevent this, we will announce the proper pronunciation if the Wilcox-Rich people will tell us what it is.

Writer Invents New Occupation

" . . . toil that no steel puddler ever knows . . ."—George Sokolsky in *This Week.*

JOB that no steel mill ever knew. —A.H.D.

January Iron Output Down Only 4.1 Per Cent

PRODUCTION of coke pig iron in January totaled 1,429,085 gross tons compared with 1,490,324 tons in December. The daily rate last month showed a decline of only 4.1 per cent from that in December, or from 48,075 tons to 46,100 tons.

On Feb. 1 there were 91 furnaces making iron, operating at a rate of 46,035 tons daily, compared with 95 furnaces on Jan. 1, producing at the rate of 44,470 tons daily. Seven furnaces were blown out or banked and three were blown in. Independent producers took four off blast and merchant producers put out or banked three furnaces. Of the three furnaces blown in, one belonged to an independent producer and the other two were merchant stacks.

Among the furnaces blown out or banked were the following: Standish, Chateaugay Ore & Iron Co.; one Eliza, Jones & Laughlin Steel Corp.; Anna, Struthers Iron & Steel Co.; one Otis, Otis Steel Co.; one Calumet, Wisconsin Steel Co.; one Ford Motor Co. furnace; and North Birmingham No. 4, Sloss-Sheffield Steel & Iron Co.

The three furnaces put in blast were a Sparrows Point unit of the Bethlehem Steel Co., one Pioneer furnace, Republic Steel Corp., and a Woodward Iron Co. furnace.

The number of available furnaces making pig iron has been reduced from 239 to 238 by the abandonment of one of the Lackawanna furnaces of Bethlehem Steel Co.

Daily Average Production of Coke Pig Iron

Gross Tons

	1938	1937	1936	1935	1934
January	46,100	103,597	65,351	47,656	39,201
February	....	107,115	62,886	57,448	45,131
March	....	111,596	65,816	57,098	52,243
April	....	113,055	80,125	55,449	57,561
May	....	114,104	85,432	55,713	65,900
June	....	103,584	86,208	51,570	64,338
½ year	....	108,876	74,331	54,138	54,134
July	....	112,866	83,686	49,041	39,510
August	....	116,317	87,475	56,816	34,012
September	....	113,679	91,010	59,216	29,935
October	....	93,311	96,512	63,820	30,679
November	....	66,891	98,246	68,864	31,398
December	....	48,075	100,485	67,950	33,149
Year	....	100,305	83,658	67,556	43,592

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1938	1937	1938	1937
January	1,429,085	3,211,500	22,388	23,060
February	.....	2,999,218	....	24,228
March	.....	3,459,473	....	27,757
April	.....	3,391,665	....	26,765
May	.....	3,537,231	....	34,632
June	.....	3,107,506	....	34,415
½ year	.....	19,706,593	....	170,857
July	.....	3,498,858	....	23,913
August	.....	3,605,818	....	29,596
September	.....	3,410,371	....	26,100
October	.....	2,892,629	....	26,348
November	.....	2,006,724	....	25,473
December	.....	1,490,324	....	22,674
Year	.....	36,611,317	....	324,961

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1938	1937	1936	1935	1934
January	10,635	16,106	10,537	3,926	7,800
February	....	16,514	11,296	6,288	7,071
March	....	16,457	10,831	7,089	7,197
April	....	14,517	13,897	8,799	8,838
May	....	19,483	12,814	8,441	9,099
June	....	15,870	14,209	7,874	9,499
July	....	19,609	11,619	8,644	7,880
August	....	17,831	12,148	8,194	6,043
September	....	20,065	12,526	10,090	4,986
October	....	18,950	13,645	11,199	5,765
November	....	15,662	14,739	12,503	6,610
December	....	10,964	14,852	13,312	4,399

Production by Districts and Coke Furnaces in Blast

(Gross Tons)

Furnaces	Production: January (31 Days)	Production: December (31 Days)	Feb. 1: Number in Blast	Feb. 1: Operating Rate, Tons a Day	Jan. 1: Number in Blast	Jan. 1: Operating Rate, Tons a Day
New York:						
Buffalo	110,465	108,257	7	3,565	7	3,490
Other New York and Mass.	5,929	15,332	0	....	1	245
Pennsylvania:						
Lehigh Valley	53,097	50,134	5	1,715	5	1,615
Schuylkill Valley	27,271	26,323	2	880	2	850
Susquehanna and Lebanon Valleys	10,982	12,831	1	355	1	415
Ferromanganese	.....	.....	0	.....	0	.....
Pittsburgh District	247,611	238,981	15	8,050	16	7,860
Ferro. and Spiegel	11,305	11,006	2	365	2	355
Shenango Valley	21,251	17,648	1	685	1	570
Western Pennsylvania	38,561	27,549	2	1,245	2	795
Ferro. and Spiegel	5,671	6,435	1	185	1	125
Maryland	86,044	86,633	4	3,375	3	2,220
Wheeling District	82,936	82,195	5	2,675	5	2,175
Ohio:						
Mahoning Valley	86,319	108,441	5	2,670	6	2,660
Central and Northern	118,964	132,080	7	3,660	8	3,840
Southern	25,079	24,687	3	810	3	795
Illinois and Indiana	261,785	283,550	13	8,270	14	9,035
Michigan and Minnesota	47,964	74,364	3	1,450	4	2,145
Colorado, Missouri and Utah	23,758	25,393	2	765	2	820
Ferromanganese	.....	.....	0	.....	0	.....
The South:						
Virginia	.....	.....	0	.....	0	.....
Ferromanganese	.....	1,453	0	.....	0	.....
Kentucky	10,899	7,006	1	350	1	225
Alabama	147,782	143,635	11	4,790	10	4,030
Ferromanganese and Spiegel	5,412	6,391	1	175	1	205
Tennessee	.....	.....	0	.....	0	.....
Total	1,429,085	1,490,324	91	46,035	95	44,470

Pittsburgh Gas Meeting Will Hear Metallurgists

Steel men attending the annual industrial gas sales conference of the Industrial Gas Section, American Gas Association at the William Penn Hotel, Pittsburgh, March 7 and 8, will hear papers on "Immersion Heating Capitalizes the Advantages of Gas For Soft Metal Melting" by Elmer B. Dunkak, vice-president, The C. M. Kemp Mfg. Co., Baltimore; "Improvements in Crucible Melting With Gas" by Ralph D. Hawkins, Bridgeport Gas Light Co., Bridgeport, Conn., chairman, non-ferrous metals committee and Oliver D. Pritchard, Brooklyn Union Gas Co., Brooklyn; "A Discussion of Up-to-date Gas Forging Practices," by M. W. Martin, Public Service Co. of Indiana, Indianapolis, and "Heating Galvanizing Pots With Convection Gas Heat."

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Order volume low, but inquiries show an increase in all districts.

o o o

. . . Automotive plants begin to line up equipment for 1939 changes.

o o o

. . . Ford and General Motors start tool and die programs.

Inquiries Out for 1938 Auto Programs; Die Shops Active

DETROIT—Tool and die programs at Ford and General Motors have been officially launched, a certain indication that outside firms will soon be busy preparing for 1939 production. About 1500 tool makers returned to work at Ford's a week ago and Fisher called its men back Monday. Plans for equipping Ford's new press shop are progressing rapidly, with inquiries out now for approximately 300 presses. Machine inquiries generally showed a sharp increase about the first of the month with planning being done for a new Pontiac engine in addition to others recently reported. Very little of the automotive business has reached the order-taking stage, but sales are expected in the next week or ten days.

Toolroom Equipment Builders Report Increase in Orders

CLEVELAND—The January volume of machine tool sales in this district was slightly improved over December, and the first few days of February have resulted in a continuation of the modest gains. However, in comparison with one year ago, domestic business is very poor, and manufacturers are rapidly catching up on their deliveries, partly due to the fact numerous consumers have requested delayed deliveries until general business conditions improve.

Toolroom equipment manufacturers find increased call for the repair and modernization of older machines which in better times would be relegated to secondary departments. Ford Motor Co. is understood to have placed some special equipment for its new die shop. The same automobile manufacturer is reported inquiring for special equipment needed in the production of its smaller motors, which are increasingly better in demand. Chesapeake & Ohio Railroad has purchased all the tools for which it was inquiring recently. Among the domestic markets which are holding up fairly well is the oil industry.

Brisk Domestic Inquiries Make Cincinnati Builders Optimistic

CINCINNATI—The machine tool market is steadily quiet. Domestic demand is still well behind normal anticipations, while foreign ordering shows the greater briskness. As noted heretofore, business from home sources reflects a wide and apparently sincere interest in retooling. Business from abroad is from both European and Asiatic interests and ranges from one or two tools to orders of fair substance, although information as to exact quantities is withheld. All types of tools except drills are in current orders, the number fluctuating with price and size. As last week, lathes, millers and grinders are still most active in demand.

Market optimism is still noticeable as manufacturers indicate the steady and apparently sincere rate of inquiry. Plant operations are at the same level as last week, just under 50 per cent of capacity.

Sentiment Good in Chicago, Based on Inquiries

CHICAGO—Machine tool sales offices here report that business has continued on a low level in the past week. Inquiries, however, are said to be fairly numerous, with indications that some may materialize into orders this quarter. Sentiment in the trade remains on the optimistic side for the most part, the general feeling still being that the present recession is only temporary. Backlogs of equipment manufacturers are being worked further down, but they still are large enough to support the present rate of production another 60 to 90 days. Current operations in the trade average between 60 and 70 per cent of capacity. Nothing further has been announced on the Burlington's plan to spend $1,000,000 for improvements and expansion at its shops in Burlington, Iowa.

Gulf Coast Line To Buy $21,670 Worth Machinery

ST. LOUIS—The Gulf Coast Lines, a subsidiary of the Missouri-Pacific, has been authorized by the Federal Court at St. Louis to expend $21,670 for shop machinery and tools, including the following: One 10-ft. ⅜-in. capacity squaring shear and one 12-ft. ½-in. capacity press brake, $13,237; one 30-ton drop pit jack and motor, $1200; one shell planing and one single shoe-and-wedge attachment for draw cut shaper, $1500; one 100-ton ball bearing jack, $1000; two reversible pneumatic impact wrenches, $850; two portable paint spraying outfits, $700; two portable pipe threading machines, $770; two electric plating machines, $850; and one 400-amp. electric welding machine, $800.

The International-Great Northern Railway, another subsidiary of the Missouri-Pacific, has been authorized by the Federal Court at St. Louis to expend $12,270 for shop machinery and tools as follows: One shell planing attachment, $1500; one 1½-ton electric operated hoist, $1810; one metal cut-off saw, $2000; two 50-ton ball bearing air jacks, $700; two portable pipe threading machines, $780; two 100-ton ball bearing jacks, $1100; two paint spraying outfits, $600; one 30-ton hydraulic drop jack, $1000; one motor driven woodworking machine, $650; two 100-ton, air-operated jacks, $1100; one small hollow chisel mortising machine, $1030.

Inquiries for Replacement Rise at Pittsburgh

PITTSBURGH—Machine tool dealers hope for a better volume of business in the near future, but orders during the past week reflected little or no improvement from recent activity. However, the volume of inquiries increased slightly. January business was a trifle ahead of the December volume. Inquiries and orders cover the general list of machine tools with no one item outstanding. Interest in equipment for expansion purposes has subsided considerably because of business conditions and the majority of new orders involve replacements. Westinghouse Electric & Mfg. Co., East Pittsburgh, has an inquiry out for a list covering turret lathes, surface grinders, drill presses, radial drills and punch presses.

Orders Off, Inquiries Active In Metropolitan Area

NEW YORK—Orders placed during the first week of the month were at an extremely low level, totaling only a few machines for the whole district. The trade is in an optimistic frame of mind, however, since inquiries are coming in from a great many sources. It is difficult to predict how many of these will culminate in orders within the next few weeks, but it is obvious that a great many manufacturing executives are getting figures ready to convince top management of the soundness of replacing obsolete equipment with the latest types, on the basis of savings in costs. One of the largest plants in this area, for example, has a host of examples where new equipment would pay for itself within a year on the basis of direct labor cost savings. A number of screw machines are up for consideration on this basis at a number of plants, and one district factory representative reports orders so far this year equal to the volume of the like period in 1937. The sales staff of this particular concern has been behind in catching up with its "request" calls during the past fortnight.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Corn Products Refining Co., 17 Battery Place, New York, plans multi-story addition to refinery at Pekin, Ill. Cost about $275,000 with equipment. Company engineer, Chicago office, 333 North Michigan Avenue, is in charge.

Wells Brothers Iron & Plate Works, 1344 Webster Avenue, New York, manufacturer of iron and steel products, has leased one-story building at 36-17 Twenty-second Street, Long Island City, for new plant.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Feb. 18 for 55 to 165 dynamotor units and spare parts (Circular 114).

T. J. Ronan Co., Inc., 749 East 135th Street, New York, manufacturer of paints, varnishes, oils, etc., has leased five-story building at Willow Avenue and 135th Street, about 30,000 sq. ft. of floor space, and will improve for plant.

Petroleum Conversion Corp., 100 East Forty-second Street, New York, manufacturer of refined oils, is removing its plant from Texas City, Tex., to building recently leased at Bayway Terminal, Bayway, Elizabeth, N. J., totaling about 22,000 sq. ft. of floor space, where increased capacity will be carried out, including steel tank storage and distributing facilities.

Purchasing and Contracting Officer, Quartermaster Corps, Fort Slocum, N. Y., asks bids until Feb. 18 for one portable, down-draft, fire-box steel boiler (Circular 842-33).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 18 for molybdenum alloy steel tubing (Schedule 2771) for Brooklyn Navy Yard; until Feb. 25, for discharge hose assemblies (Schedule 2782) for Brooklyn, Mare Island and Puget Sound yards.

Coca-Cola Bottling Co. of New York, Inc., 431 East 165th Street, New York, has purchased one-story building at Madison and Park Avenues, Paterson, N. J., totaling 30,000 sq. ft. of floor space, and will remodel for new branch mechanical-bottling plant.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Feb. 14 for five centrifugal pumps (Circular 601), gilding metal housing, aluminum relay caps, aluminum retainers, etc. (Circular 564); until Feb. 15, 10 600-lb. steel fin assemblies, steel fabrications, for demolition bombs, 10 similar steel fabricated assemblies, 300-lb. each, for demolition bombs, 90 300-lb. and 90 600-lb. aluminum fabricated fin assemblies for demolition bombs (Circular 616); one sensitivity testing outfit (Circular 615).

Quartermaster Depot, Twenty-first and Johnston Streets, Philadelphia, asks bids until Feb. 16 for six 500-lb. portable electric lifters, double telescoping type, non-revolving base (Circular 669-170).

Synthane Corp., Highland Avenue, Oaks, Pa., manufacturer of plastics and composition products, has purchased a nine-acre tract fronting on Schylkill River, and will use part of site for expansion.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 21 for one motor-driven precision bench lathe for Philadelphia Navy Yard (Schedule 2792).

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Feb. 14 for contact plugs, contact sleeves, wire, etc. (Circular 674); until Feb. 15, special steel stockroom shelving (Circular 687).

Thomas A. Cashin, Inc., 418 Cherry Street, Philadelphia, manufacturer of machinery and parts, has leased space in building at 4060 Orchard Street for plant.

BUFFALO DISTRICT

American Bridge Co., 71 Broadway, New York, has filed plans for extensions in structural steel works at Elmira Heights, Elmira, N. Y., on adjoining property recently acquired. Work will include one-story units, with installation of traveling cranes and other mechanical-handling equipment. Cost about $100,000.

Kraft-Phenix Cheese Co., 400 North Rush Street, Chicago, has filed plans for one-story factory branch, storage and distributing plant at 138 Manitoba Street, Buffalo, with installation of tanks and other equipment. Cost close to $50,000.

WASHINGTON DIST.

Naval Supply Depot, Norfolk, Va., asks bids until Feb. 14 for two globe valve reseating outfits (Req. 4-1863); until Feb. 15, one steam vertical fire-tube boiler unit, without grates, fittings and smoke hood (Req. 27); until Feb. 16, 5-in. galvanized welded wrought iron pipe (Req. 173), brass welded chain (Req. 4-1845); until Feb. 17, three 5-gal. portable oil torches, suction type (Req. 4-1848).

Division of Purchases and Sales, Department of Commerce, Washington, asks bids until March 3 for 50 engine-generator plants, 18.75-kva., and 36 additional such plants, same capacity (Proposal 28985).

Anheuser-Busch, Inc., 721 Pestlozzi Street, St. Louis, brewer, plans one-story factory branch on Oakie Street, N.E., Washington, for bulk storage and distribution. Cost over $60,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 15 for 15,000 ft. of ½-in. galvanized wire rope, 32,000 ft. of wire rope, 1000 ft. of steel wire rope, 4000 lb. of galvanized steel seizing strand, 5000 lb. of galvanized barbed wire, 10,000 ft. of brass pipe, copper pipe, copper tubing, brass pipe, eight ½ to 3-ton chain hoists, 59,000 lb. of common steel wire nails, 5000 lb. of galvanized steel wire roofing nails, 400 lb. of copper cut nails, steel rails and other equipment (Schedule 3330).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 15 for steel bolts, nuts and lag screws (Schedule 2726), one box-type electric furnace (Schedule 2682), ball and roller bearings (Schedule 2763), one motor-driven exhauster-type blower (Schedule 2741), steel tanks (Schedule 2668); until Feb. 18, steel flanges (Schedule 2764) for Eastern and Western yards; until Feb. 15, 15-hp. induction motors, controllers and spare parts (Schedule 2793); until Feb. 18, one motor-driven, double-spindle, high-speed, vertical miller, fixtures and tools (Schedule 2742) for Washington yard; two automatic screw machines and equipment (Schedule 2563) for Alexandria, Va., yard.

NEW ENGLAND

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 15 for one motor-driven iron-working machine (Schedule 2769); until Feb. 18, 15,174 lb. copper-nickel alloy condenser tubing (Schedule 2797) for Boston Navy Yard.

Green Mountain Distillery, Inc., Burlington, Vt., plans expansion, including installation of large still and other equipment. Company is arranging financing in amount of $250,000, part of proceeds to be used for purpose noted.

Automatic Signal Corp., East Norwalk, Conn., manufacturer of traffic signals and signal systems, has acquired signal division of Tokeim Oil Tank & Pump Co., Fort Wayne, Ind., manufacturer of similar equipment and devices, and will consolidate. Division will be removed to plant at East Norwalk, where increased capacity will be arranged.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Feb. 23 for 10-kw. exciter unit (Circular 148); until March 2, one precision cutter relieving machine (Circular 149).

SOUTH ATLANTIC

United States Sugar Corp., Clewiston, Fla., plans expansion and improvements, including 2,000,000-gal. tank for molasses, processing equipment and other machinery. A development program at properties in Everglades also will be carried out. Fund of $500,000 has been arranged.

Supply Depot, Naval Air Station, Pensacola, Fla., asks bids until Feb. 16 for 12 two-ton chain hoists, 15 two-ton and 12 300-lb. plain trolleys (Req. 148-Aero-416), one drill grinder, one hardness testing machine, one squeeze-type riveter, one balancer suitable for suspending and balancing and lifting rivet squeeze complete, one motorized drive for engine lathe, one motor-driven precision-type bench lathe, one hand-operated arbor press, one electric valve refacer, three temperature regulators, one magnetic controller (Req. 148-Aero-417).

SOUTHWEST

Hygrade Water & Soda Co., 653 Tower Grove Avenue, St. Louis, has acquired a one-story building at Boyle Avenue and Papin Street, and will remodel for new mechanical-bottling works. Cost close to $40,000 with equipment.

City Commission, Miami, Okla., has authorized purchase of new diesel engine-generator unit and auxiliary equipment for municipal electric power station.

Southern Mill & Mfg. Co., 525 South Troost Street, Tulsa, Okla., will remodel building at location noted for a new brewery. Complete brew-house, tanks, bottling machinery and other equipment will be installed. Cost over $60,000 with machinery. W. H. and George S. Ahrens are heads. C. F. Koenig is company engineer.

Construction Service, Veterans' Administration, Washington, asks bids until March 1 for auxiliary boiler plant and safety control equipment for power house at institution at Muskogee, Okla.

Rogers Galvanizing Co., Tulsa, Okla., has let general contract to Tulsa Boiler & Machinery Corp., 2020 South Union Street, for one-story branch plant just outside of city limits of Houston, Tex., 50 x 200 ft. Cost over $45,000 with equipment.

Pepsi Cola Bottling Co., Abilene, Tex., has let general contract to H. L. Rice, 1602 College Drive, for new two-story mechanical-bottling plant at Thirteenth and Pine Streets, 74 x 82 ft. Cost close to $50,000 with equipment. Gaskill-McDaniel, Alexander Building, is architect.

Port City Stockyards Co., Calhoun Road, Houston, Tex., meat packer, has plans for additions, comprising a two-story building and several one-story units. Cost over $65,000 with equipment.

City Council, Robstown, Tex., has been authorized to arrange bond issue of $350,000, of which $275,000 will be used for a new municipal electric power plant and system, and $75,000 for municipal gas distribution system. Garrett Engineering Co., Houston, Tex., is consulting engineer.

SOUTH CENTRAL

Southwestern Oil & Refining Co., Weber Building, Lake Charles, La., Harry E. Clark, president, recently organized, has leased about 45 acres fronting on Calcasieu Lake, for new oil refining plant, on which work will begin at once. Initial units will cost close to $100,000 with equipment. I. B. Chittenden is engineer and superintendent in charge of construction.

United States Engineer Office, Vicksburg, Miss., asks bids until Feb. 15 for 12 glands